FLYING
JANUARY
1947
25¢
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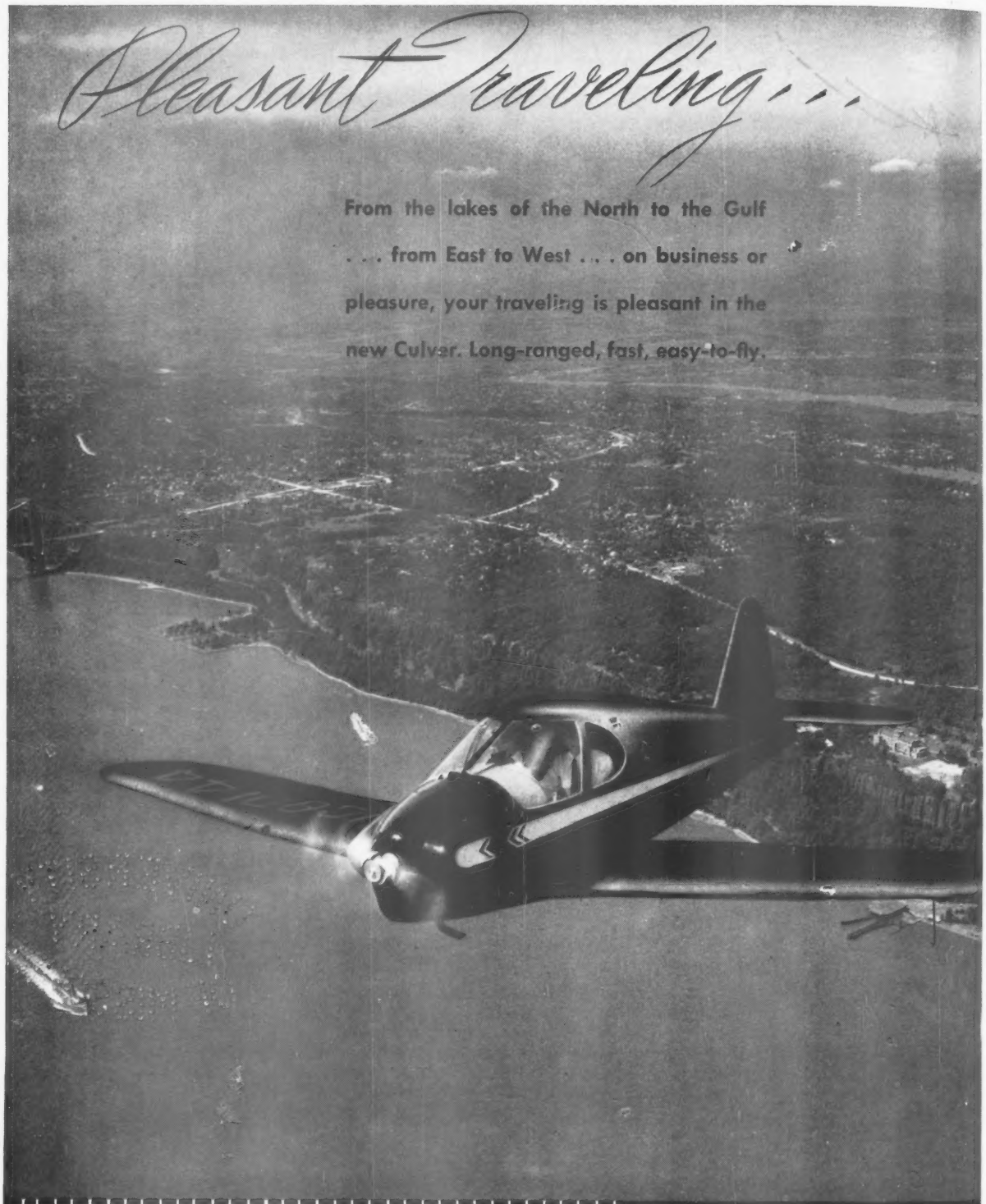
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I'd like to fly the Culver Model "V." Who is my nearest Culver Dealer? (I am, am not a pilot.)

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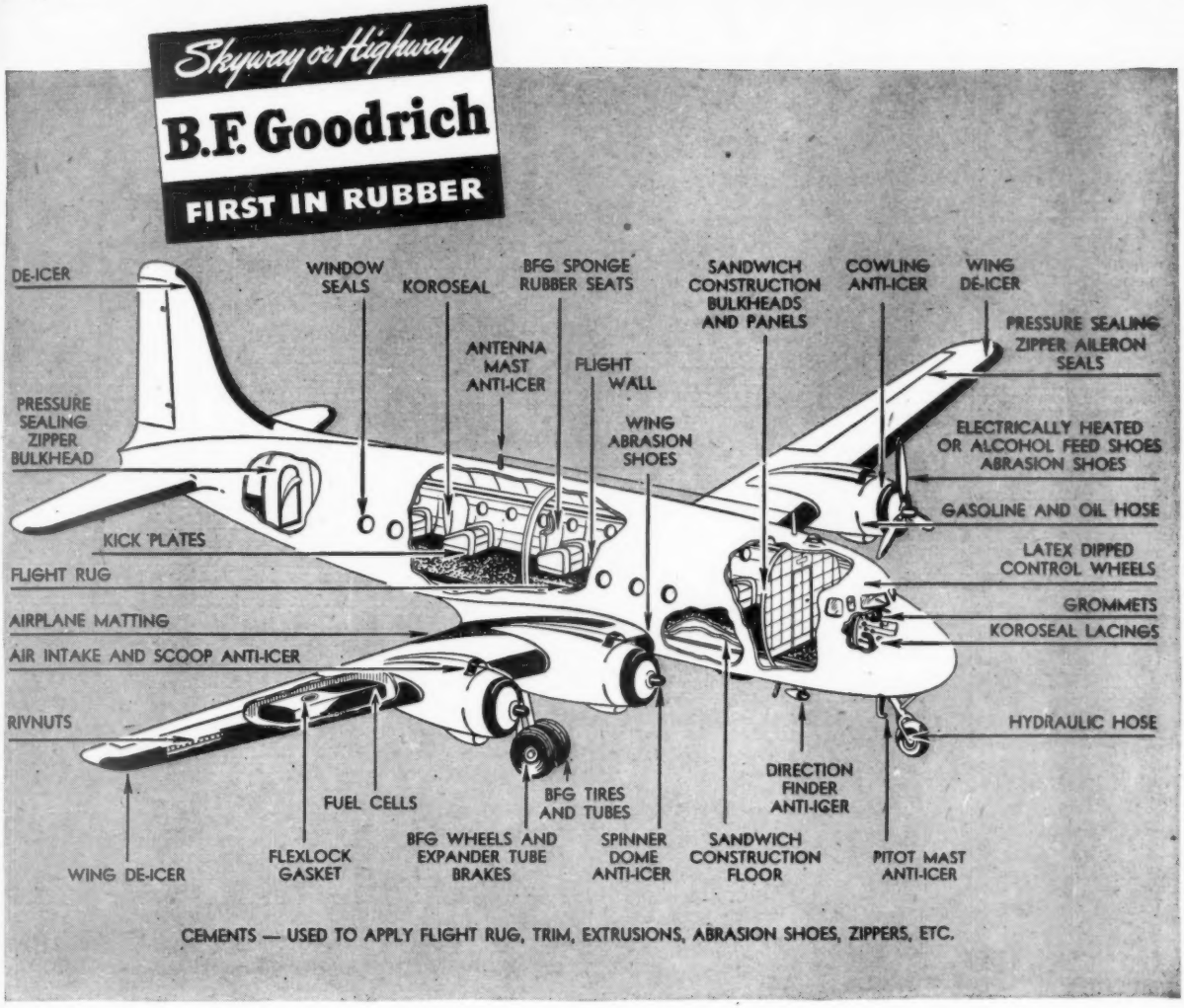

How rubber makes flying safer, more comfortable, too

SOME big airplanes need more than a ton of rubber products to keep them flying. Some smaller airplanes may have more than fifty different rubber accessories, from tires to window seals. The cut-away picture shows what some of these products are, and where they would be found in a big, 4-motor transport.

First, there are the products necessary for safety.

These include the tires that must cushion the landings and bring the plane in comfortably and safely. Then, there are the De-Icers, made only by B. F. Goodrich, to break away the ice that forms on wings and tail surfaces in some flying weather.

The electrically heated rubber shoes that protect propellers and other parts of the airplane are also important for safe flight in all weather. The hose, seals, brakes, and many other rubber parts are also vital to efficient flying.

Then, there are the products that make flying more comfortable.

Airline cabins are equipped with comfortable sponge rubber seats, and many of them have B. F. Goodrich flooring materials made of durable, cushioning synthetic elastic materials. Soundproofed cabins are attractively finished in decorative fire-resistant materials, such as B. F. Goodrich Koroseal upholstery and trim.

B. F. Goodrich engineers continue to work with airplane designers to develop new products wherever rubber and synthetic materials may make the planes better, cheaper, or safer. *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

B.F.Goodrich

FIRST IN RUBBER

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THE COVER: An experimental Aeronca Chum is flown by Lou Wehring, Aeronca's test pilot.

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FLYING

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JANUARY • 1947

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ALL SET TO GO IN YOUR SEABEE?

Pack all your stuff in your new Seabee—and fly, fly, fly! What a thrill! We can appreciate your excitement, being definitely air-minded ourselves. And we'd like to share with you one secret of happy flying!

That is: to help get the best performance out of your plane, use the best fuels and lubricants! And, lots of flying men will tell you, the best fuels and lubricants you can buy in the great Middle-West are Phillips 66 Aviation Products!

Yes, the company with its heart in the air has available a fine aviation engine oil . . . as well as plenty of UNLEADED 80-octane gasoline . . . for your flying pleasure!

So when you "bring 'er down" at some field in the Middle-West, taxi over to the orange-and-black "66" sign.

We'll be glad to meet you . . . at the "66" pumps! The Aviation Department, Phillips Petroleum Company, Bartlesville, Oklahoma.

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AVIATION GASOLINE

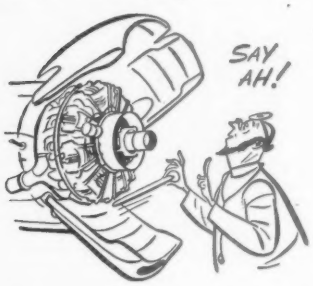
HANGAR FLYING

LOCKHEED

The Mechanical Mouth

It used to be like pulling teeth to get under an engine cowling. After a quarter-hour of yanking on rows of fasteners, you took down a truckload of Dural shingles. If you didn't lose or mash any under foot while you worked on the engine, you were lucky.

Now it's as simple as lifting the hood on the family bus. Lockheed engineers have worked out a new mechanical mouth for *Constellation* engines that opens up in two minutes flat. Unclasp and lift two small side panels, pull away the one-piece upper and lower hoods, and the engine's as bare as the tonsils of a six-year old saying "Ah!"



The giant metal jaws stay open obligingly, and completely out of the way. Prying engine medicos get plenty of elbow room and save precious minutes on routine inspections. And the mechanical mouth shuts just as fast. Out at Lockheed, the story goes, they took turns saying "Jack Robinson" in timing it.

Everybody that sees the mechanical mouth says it's just common sense. And it's this kind of common sense that gets all the green lights at Lockheed and keeps refinements in step with aviation progress.

L to L for L

© 1946, Lockheed Aircraft Corp., Burbank, Calif.

LETTERS

NO LANDING FEES IN COLUMBUS

This office has been queried by various operators and private pilots concerning landing fees for private planes assessed at Port Columbus, O. There are no landing fees in force for private flyers at Port Columbus and, furthermore, no fees are contemplated in the near future.

Port Columbus receives landing fees only from scheduled airlines and non-scheduled charter and cargo flights.

FRANCIS A. BOLTON, Supt.,
Port Columbus Airport
Port Columbus, O.

ENGINE VS. COMPASS

After reading and rereading your article "How to Swing Your Compass" (October issue), I find only casual mention that the engine and its accessories will affect the compass. That is a gross understatement. On the average airplane the engine, mags, etc., are responsible for error in the compass that often runs as high as 20°.

As long as we use the magnetic compass, therefore, the engine should be in operation when swinging the compass. Actually, the engine should be running at cruising speed. But this often is impractical. For the sake of accuracy in swinging that compass, however, one had better have the engine running at least at a fast idle.

ROBERT E. MYERS

Victorville, Calif.

COMPASS ERROR

I would like to call your attention to what I believe to be an error in the article "How to Swing Your Compass" by A. P. English (October issue).

On page 94 the author shows a work sheet which lists the readings for the master compass and the plane compass. According to this sheet when the plane is headed north by the master compass, the plane compass reads 1°. Likewise for 45° the compass reads 44°, for 90° the compass reads 87°, etc.

Then Mr. English makes up a compass card which I believe is in error. This card says to fly north steer 369°, to fly 90° steer 93°. Why should I do this? If the compass read 1° when flying north, I should fly 1° or if when heading east the plane compass reads 87°, why fly 93°, etc.? His compass card should be as follows:

For	Steer	For	Steer
North	1°	180°	181°
45°	44°	225°	229°
90°	87°	270°	272°
135°	133°	315°	314°

In other words, the work sheet is a compass card in itself. I have been making my compass cards up by applying the above deviation for 19 years. If I am wrong, will someone please tell me why I have been reaching my destinations all this time without getting lost?

J. H. BUCKLE

Fresno, Calif.

● FLYING's editors asked the author for an answer to Mr. Buckle's inquiry. He wrote as follows:

"Mr. Buckle is right. This serious error must be rectified without delay. I had originally, as my notes prove, set up a work sheet in which my errors were the exact opposite of the errors I finally used in my article. The fact that I failed to change my correction card, and missed it even when galley proofs were forwarded me, obviates any alibi I may try to offer.

"Although Mr. Buckle's alertness has mortified me, nevertheless I am grateful for his interest and promptness in calling attention to this inexcusable error."

A. P. ENGLISH

New Canaan, Conn.

HE WANTS TO FLY

During the war I was an Army captain and a *Lightning* pilot; before that a staff sergeant and a war-time air cadet. Then, the war ended and I had to choose between becoming a civilian or re-enlisting in the Army. As you know, all former officers were given the chance to enlist at a master sergeant's rating. I accepted the offer, gained two stripes and some severance, but although I kept my wings, I'm a chair-bound office flunky. The Army spent thousands teaching me to fly and now I'm grounded—and not collecting one bit of flight pay.

MASTER SERGEANT, USAAF

San Antonio, Tex.

● According to the War Department, you are entitled to become an active member of the Army Air Reserve program and fly during off-duty hours as an officer of the Reserve. You are entitled to 80 hours a year in *Texans, Mustangs* and *Kansases*. You retain your master sergeant's rating in the regular Army and a commissioned rank in the Reserve. You will, however, be subject to the same screening given reserve officers on an inactive status.—ED.

ARMY RESERVE PILOTS

Your article "Week-End Warriers" (October issue) was one to warm the heart of Navy Reserve pilots, but one to eat the heart out of every Army Reserve pilot. Yes, we have a reserve setup, and a fine one it is. We are entitled to 80 hours a year—providing we have the time to wait while six AT-6s, three P-51s, and two AT-7s are flown by every other reserve pilot in the state of Michigan.

I would like to see an article in FLYING on the Air Forces Reserve Training—

(*Continued on page* 90)

TRAINED OVER 3500 LIGHT-PLANE PILOTS

FLIES AERONCA TODAY!

LT. COL. T. STEWART BAKER, FORMER DIRECTOR OF FLIGHT TRAINING FOR ARMY GROUND FORCE AIR TRAINING SCHOOL

WANT an expert's opinion? Here's your man! Col. Baker headed up flight training for the Army Ground Force Air Training School. He trained thousands of pilots *not only in Aeroncas but in almost every other known make of light plane.*

TODAY HE FLIES AERONCA!

Yes, back again in his civilian position with Aero Training and Transport, Inc., at Lunken Airport, Col. Baker is yet another ex-service pilot who *knows his planes, knows his flying and chooses Aeronca over all others!*

Aeronca's plenty proud of being the overwhelming choice of so many ex-service flyers. It's proof of Aeronca's superiority in design, engineering, and flight performance. And the thousands of non-flyers who flock to Aeronca prove its unequaled flying ease.

Take the Aeronca Chief. Here's the de luxe two-place plane in the low price field. You get handy starter, fine visibility, Oleo landing gear, luxurious cabin interior . . . a cruising speed of 90 mph. and a range of 420 miles. In short, you get the finest in beauty and performance. And—if you prefer a tandem model—you just can't top the Aeronca Champion.

Get out to the airport. See and fly both these great Aeronca planes. And remember—when you *buy* Aeronca, your Aeronca dealer will teach you to *fly* Aeronca FREE! Aeronca Aircraft Corporation, Middletown, Ohio.

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HAVE YOU HEARD?

. . . About the paper shortage? That explains the varied grades of paper Flying has used recently. We expect that better paper in the near future will permit us to return to the uniform high-quality stock which has always been one of the hallmarks of Flying's excellent publishing job.

. . . **Oddest of helicopters** is one produced by the Germans during World War II. Recently tested at Wright Field, the Nazi 'copter (V-4) pipes the exhaust to blade tips in powering its main rotor. A smaller engine powers a pusher propeller at the rear of the fuselage, to counteract torque. Neither engine directly propels the V-4. Forward speed, ranging up to 25 m.p.h., is attained by tipping the tail elevators. It is believed this can be increased by the addition of another propeller and experiments are now being conducted along these lines at Wright Field.

. . . **Other animals can fly higher than man,** so says the Air Transport Association report on experiments conducted for Western Air Lines. Purpose of the project was to provide accurate information for pet owners, poultrymen and commercial shippers who use air transportation. Tests proved that short decompression exposures approximating altitudes up to 20,000 feet should not prove permanently harmful to any well animal, though man comes off second best to many of them. Live crabs and lobsters may not be flown higher than 17,000 feet. Hatching eggs in laboratory experiments have withstood altitudes of 80,000 feet, but chickens of any age have a tolerance of around 17,000 feet. Rabbits can stand 27,000 feet.

. . . **All Americans who served with the Royal Canadian Air Force** prior to January, 1943, are eligible for membership in the Hat and Leaf Squadron which is similar to the Lafayette Escadrille of World War I. The group creating the organization is eager to locate former "buddies." All those qualified and interested in membership should write to John L. Scherer, Box 391, Penn Yan, N. Y., enclosing three cents for return postage. It is a nonprofit organization.

. . . **Newest attraction in airline travel** is the international "nightclub special" inaugurated by Pan American Airways. During the Miami winter season, there is a special flight to Havana, Cuba, at 9:00 p.m. each night. Guests make the trip in evening clothes, get to Havana in time for several hours of night life, returning before the next dawn.

. . . **Latest device to overcome** darkness and fog, making 24-hour flight possible for lightplanes, is the light-weight search radar announced by Air Materiel Command headquarters. Called the APS-10, the device weighs only 125 pounds and is operated by five controls. Because of its compactness, any four-passenger aircraft can afford its weight and power requirements. Simplified for mass production, the APS-10 is the first in a series of projected lightweight easy-to-operate-and-maintain search radars.

. . . **Music was literally flying** when an airfreight shipment of pianos, 36 of them weighing more than 14,000 pounds, took off from Philadelphia recently. Eighteen pianos were loaded aboard a plane bound for Oakland, Calif., and the other 18 went to Miami, Fla. The shipper, Lester Piano Manufacturing Co., plans to continue such airfreight shipments to its regional outlets.

. . . **Helicopters for Hawaii intra-island use** are being considered by Hawaiian Airlines which recently purchased a Sikorsky S-51, four-place helicopter. Hawaii's population of 514,000 is scattered upon six major islands of rugged, volcanic terrain covering a span of 350 to 400 miles. It is believed that the helicopter will supplement the company's regular inter-island schedules, and bring almost every isolated area within only two hours or so of Honolulu.

. . . **Students at Parks College of Aeronautics,** now part of St. Louis University, have a P-59 to observe and study. The school believes it is the first college in the United States to acquire a jet-propelled plane.

. . . **All-plastic airplanes are a possibility** since the first glass fiber aircraft wing to meet all strength requirements was successfully tested at Wright Field. Engineers say that the development of this glass fiber wing proves the suitability of the material for a complete structure which may withstand rigors of supersonic flight better than metal. The material is heat resistant and resilient. No rivets were used in the wing.

. . . **Elimination of 90 per cent of the noise in 65- to 85-h.p. aircraft engines** is possible with the lightweight stainless steel muffler developed by Ryan Aeronautical Co. Described as the "first CAA-approved lightplane exhaust to be manufactured of non-corrosive material," the new muffler incorporates in its design (1) a complete exhaust system; (2) provision for heating carburetor air; and (3) provision for delivering heat to the cabin for greater passenger comfort.

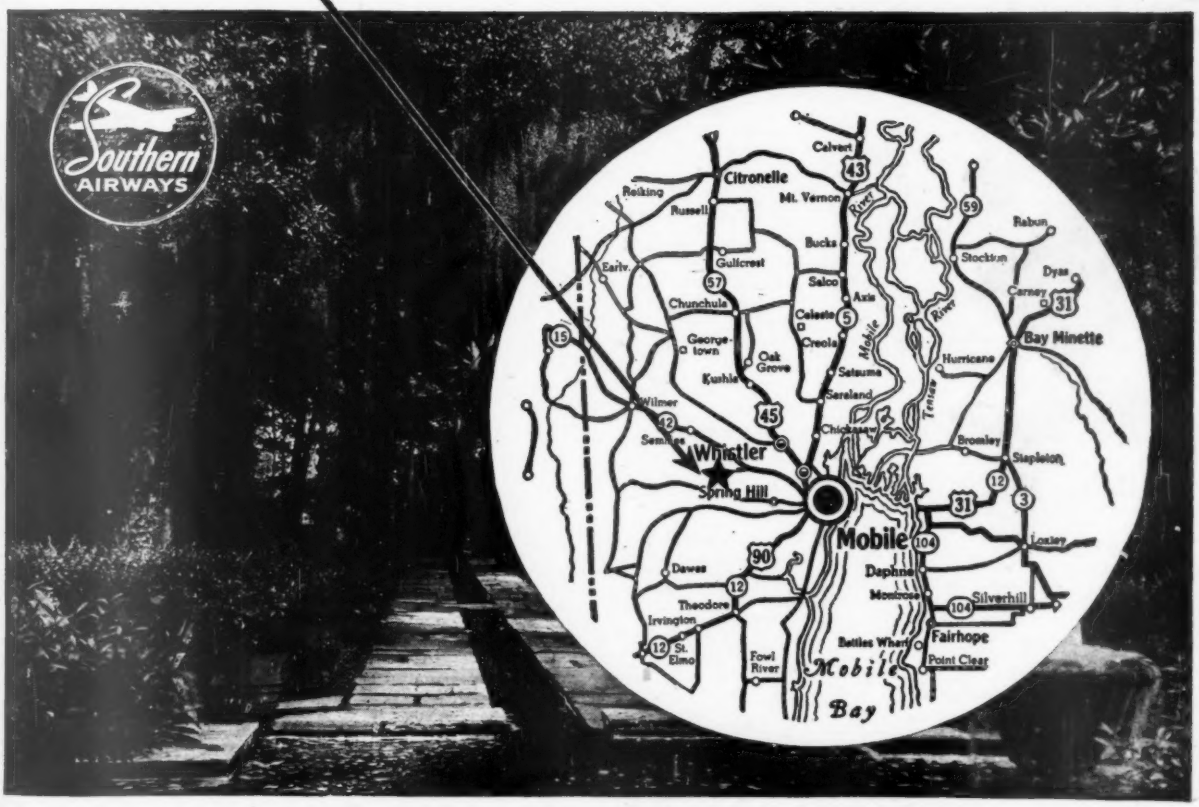
END

FLY TO THE *Gulf Coast*

ITS GARDENS, ITS GRACIOUS HOSPITALITY

Deep in the South—in the country of Spanish moss, stately mansions, and the world-famous Bellingrath Gardens—is Bates Field . . . just ten miles from Mobile, thirty miles from the Gulf of Mexico.

Bates Field is a thoroughly modern Class 4 airport, with 5,000-foot paved runways. It offers complete flight facilities . . . storage, mechanical service, flight instruction, charter service, and lounge facilities. It is also a sales agency for Piper Cub, Beechcraft, and Republic aircraft.



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Operated by Southern Airways (who use Cities Service products exclusively), Bates Field supplies 80 and 91 octane Cities Service Aviation Gasolene, Koolmotor Motor Oil, Trojan Greases, and Cities Service Aero Specialty Oils.

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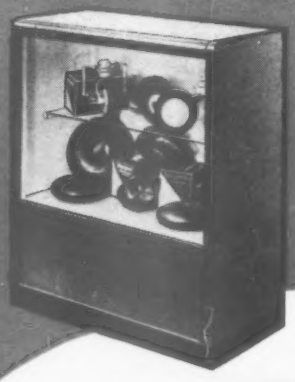

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Help you make more money

APPEARANCE plays a big part in successful retailing. Firestone furnishes its aircraft dealers modern, practical, specially designed display equipment reasonably priced. It presents aircraft accessories in a sales-producing manner and makes the Firestone dealer's salesroom the envy of every airport operator.

But that is only one feature of the Firestone Aircraft Franchise — merchandise is of top quality, priced for quick turnover — proven selling plans and aggressive merchandising and advertising helps are available. In all, Firestone goes *further* in helping the dealer make greater profits.

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The Complete

Firestone

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WITH A COMPLETE P

Firestone
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PROFIT MAKING AIRCRAFT FRANCHISE

a hop—skip—

and a landing!

The War Assets Administration of the U. S. Government has appointed agents all over the country to make war-surplus aircraft components available to you.

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A handy directory of the names and addresses of all WAA agents complete with a ready-reference map has been prepared for your convenience. Send for your copy and see how close your nearest agent is. Just fill in and mail the coupon on the opposite page and this helpful booklet will be mailed to you at once. It will furnish you with a complete list of authorized WAA agents and the items they feature.

Any WAA agent is at *your* service. But, however, if it is more convenient, patronize our National Aircraft Components Sales Center, 6200 Riverside Drive, Municipal Airport, Cleveland, 32, Ohio.

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Please send me the list of Authorized WAA agents.

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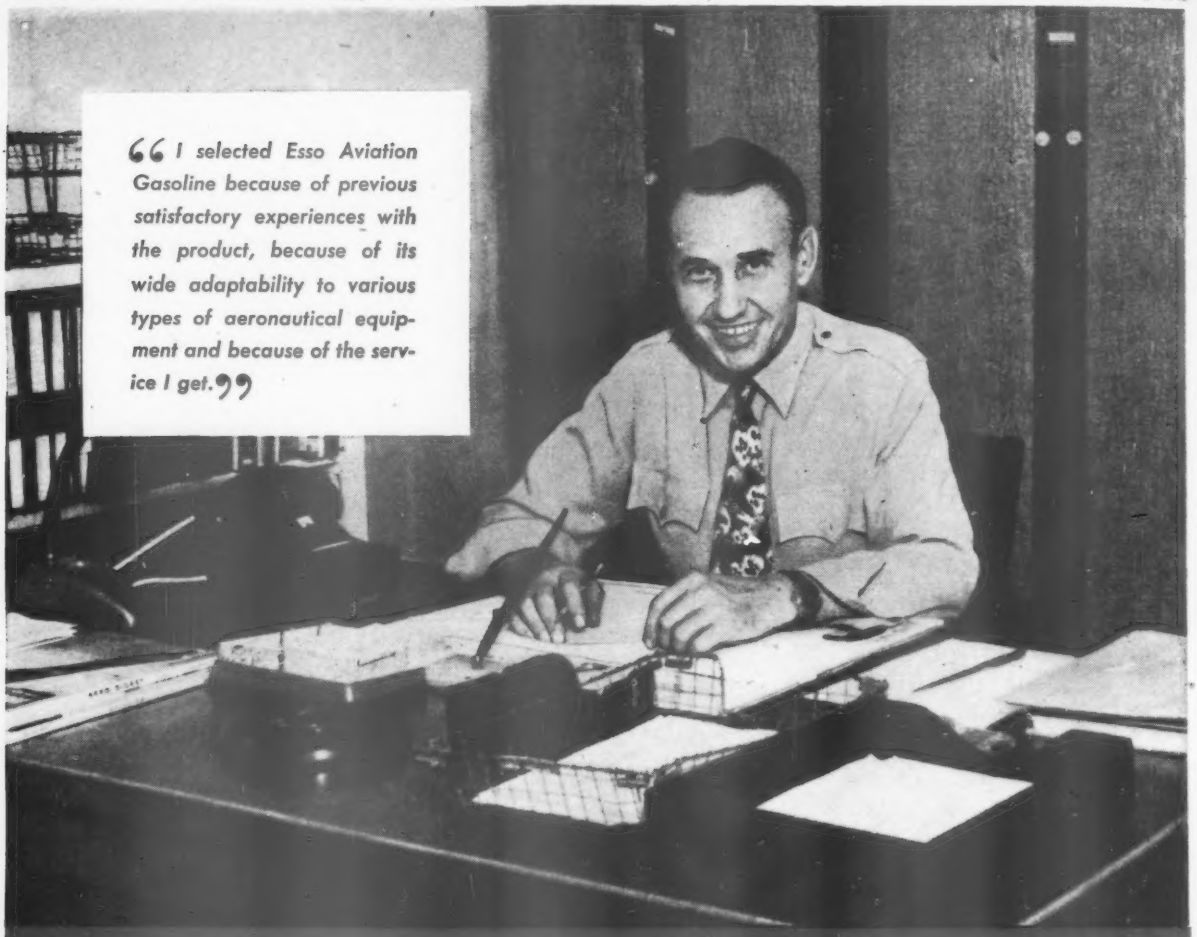
NO. 12 IN THE SERIES, FEATURING PROMINENT ESSO AIRPORT OPERATORS


"I selected Esso Aviation Gasoline because of previous satisfactory experiences with the product, because of its wide adaptability to various types of aeronautical equipment and because of the service I get."

Mr. Blake's three big reasons!

A veteran aviation enthusiast, Mr. Walter M. Blake started flying in 1927. His experience is varied and wide... from a District Sales Manager for the Stinson Aircraft Corporation to a Captain for PAA and the Royal AFTC. Holding six different aviation licenses and certificates, Mr. Blake now manages McKellar Airport, Jackson, Tenn.

More and more experienced men in aviation are swinging over to Esso Aviation Products. They know that Esso Aviation Dealers are in step with air progress with ever-better Esso Aviation Products, backed by intensive Esso Aviation Research... and over 40 years of continuous aviation experience, dating from the Wright Brothers' first flight at Kitty Hawk!

Characteristic...

Thunderjet . . . Rainbow . . . Seabee . . . each of superb individual qualities . . . yet with that unmistakable rugged family trait of the famous P-47 Thunderbolt, bred into Republic planes since inception. ℂ Into an era of Peace . . . that will brook no further endangering . . . the jet-propelled Republic Thunderjet . . . fastest of all. ℂ Into an era of stratosphere flight . . . inherently Republic . . . the Rainbow . . . a revolutionary transport with cruising speeds of over 400 miles per hour. ℂ Into an era of Independence . . . still inherently Republic . . . the Seabee, all-metal, four-place amphibian brings adventure that starts from field or stream. It is truly Republic's era . . . a heritage of the finest.

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● *Top Speed, 184 mph; Cruising Speed, 175 mph; Landing Speed, 46 mph; Range, 750 miles*

Complete Your Company's Transportation "System"

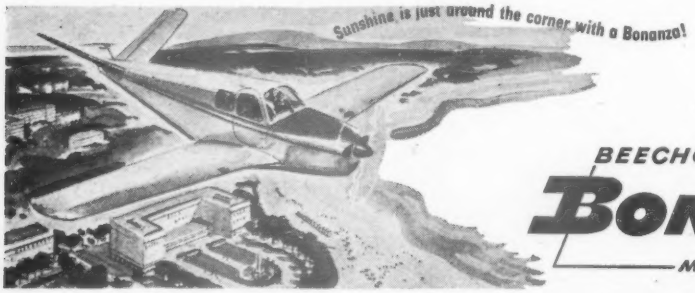
with a Beechcraft BONANZA

THE company truck and the company car are now joined by the Beechcraft Bonanza. For it hurdles long distances at 175 mph, speeding executives and personnel around the country with four times the efficiency of surface transportation—and at a cost as low as one cent per passenger mile!

No ordinary airplane is capable of the utility required of a business vehicle. But the Bonanza is an *extraordinary* airplane. It was *built* for business use, business utility, business economy. It has a speed and a payload with its economical 165 hp which have never before been accomplished short of 330 hp!

Its cabin for four people provides limousine luxury and comfort—thoroughly soundproofed, as quiet as an open-window car traveling at 55 mph. It is fully equipped—heater, two-way radio, landing lights and instruments for accurate and safe navigation; retractable tricycle landing gear, landing flaps and controllable prop for easy handling and added economy of operation.

The man-hours, money and travel fatigue which the Bonanza saves as a unit of your company transportation "system" repay many times its modest cost. The price complete is $7,345 F.A.F. Wichita. Production for early 1947 is already sold. Orders for delivery will be filled in the sequence received. There is a nearby Beechcraft distributor with complete facts and figures ready to consult with you. Beech Aircraft Corporation, Wichita, Kansas.



BEECHCRAFT
BONANZA
MODEL 35

Author Hartranft claims to be the most-licensed pilot in the U. S. Behind him is some of his evidence.

By J. B. HARTRANFT, Jr.

General Manager, Aircraft Owners and Pilots Association

Growing demands for state aircraft and pilot licenses threaten private flying, says author.

I AM BY WAY of becoming the most-licensed pilot in the United States and if it goes on much longer I may be unable to get my plane off the ground—it will be too loaded down with rule books, regulations, and red-tape.

The reason is a state license fever that threatens to menace the pleasure and progress of lightplane flying permanently. The fever hasn't reached epidemic proportions yet, but it could—no sooner than next year. It can also be cured as quickly and you are the doctor. But in order for you to understand the causes and cures of the disease, first let me tell you my own experiences with it.

Some time ago I inadvertently landed in a neighboring state and stayed over a long week-end. Two days later I was charged with enough violations—state, not Federal—to keep me grounded for weeks if I hadn't been able to beg off on grounds of ignorance. Since, both at work and at play, I do considerable flying to various states, I decided that the best thing for me to do was to try to meet any necessary "foreign" requirements.

The results to date should be a warning to anyone interested in private flying. I have six state licenses or registration certificates, which cost from $1 to $5 each—Idaho, New Hampshire, Maine, Virginia, Maryland and Massachusetts. I have filled out applications of varying lengths and detail, mostly on the gener-

ous side. And I have run into some of the most amazing examples of bureaucracy that it has been the experience of a resident of Washington, D. C., ever to encounter.

For instance, take Idaho. The out-of-state pilot who peruses the state's regulations encounters the following item: "All aircraft and airmen operating within the limits of the state, with certain exceptions, shall be registered with the state department of law enforcements." I am assured by experts that this does not include visiting pilots—"so long as they don't stay for a prolonged period." But how long is a "prolonged period"? To avoid trouble, I decided to register, and sat down to make out a check, only to find a slight but not untypical confusion.

You'll note above that it says to register with the state department of law enforcements. But read a little farther and you come to this one: "All airmen . . . operating within the state shall register as such with the commissioner of public works." Reading still farther, I discovered that the state has a bureau of aeronautics, within the Idaho department of public works. What to do? Should I apply for a registration blank with the department of law enforcements, the commissioner of public works, or the bureau of aeronautics? And if I pick one of them, are the others going to be sore? I finally decided on the bureau of aeronautics as my best bet, and it worked; but how neglected the others feel about this will remain a moot question till I land in Idaho.

Then there is the case of Minnesota, where—as this goes to press—I'm *not* certificated or registered. When I wrote for a license application in that state, I received a three-page, single-spaced letter from L. L. Schroeder, state commissioner of aviation, citing, among other things, that the application form is easy to fill out, the fee ($1) is negligible, no effort has been made to require pilots to register, and the only reason it is done is to keep a record. But he forgot to inclose an application blank with his letter.

Another case is New Hampshire, which charged me $5 for changing my height from six feet to 5′ 7″, upped my weight seven pounds, and refinished my blue eyes to hazel.

The question of when a non-resident pilot becomes a resident pilot is open or subject to varying local regulations or interpretations in all the seven states mentioned above. Classic example is Connecticut, where you are in trouble if you do not check in with the state aeronautical commission within 48 hours after you set your wheels on a Connecticut runway.

And I've just begun to work on the other half of the job; getting state licenses or registration for my plane.

State licensing and registration seems to be distinguished by a singular eagerness to collect fees, large or small. Only seven states appear to require licenses or registration so far but how can you tell when a new legislature will put the bite on you?

The following list tells whom to write to, but I should warn you that it is subject to change by acts which may be voted through by 1947 state legislatures. It was compiled from information obtained through my own efforts, from CAA data, and from the Air Transport Association's "Digest of State Aeronautical Laws" (1946), an excellent summary of state bureaucracy in aviation. To give you an idea, although it is only a summary, it is 336 single-spaced typewritten pages long. It was prepared by ATA's Edmond Daly and William Raymond, who should get a medal.

States where some form of registration or licensing is required and the person to contact in each state are:

CONNECTICUT—Thomas H. Lockhart, Department of Aeronautics, Post Office Box 537, Hartford 1, Conn.

IDAHO—Chester Moulton, Bureau of Aeronautics, Room 200-A State House, Boise, Ida.

MAINE—John E. Willey, Maine Aeronautics Commission, State Airport, Augusta, Me.

MARYLAND—Charles H. Buck, State Aviation Commission of Maryland, 215 Fayette street, Baltimore, Md.

MASSACHUSETTS—Crocker Snow, Massachusetts Aeronautics Commission, Room 805, 100 Nashua street, Boston 14, Mass.

NEW HAMPSHIRE—W. Russell Hilliard, New Hampshire Aeronautics Commission, State Office Building, Concord, N. H.

VIRGINIA—Allan C. Perkinson, Division of Aeronautics, State Corporation Commission, 907 Travelers Building, Richmond 19, Va.

All other states accept Federal certification as sufficient. Seven of these, by the way, do not have a department, board, or commission of aeronautics—California, Delaware, the District of Columbia, Mississippi, Montana, Oklahoma and Washington.

Public hearings by the Civil Aeronautics Board in 1941 resulted in the adoption of CAR Part 60.30 which required that no person could fly an aircraft without a CAA Pilot's Certificate. The new Part 43, which became effective in July, 1945, further strengthened this Federal licensing requirement. There can now be no doubt of the Federal Government's authority to license all planes and pilots. For this reason, if for none other, state licensing is entirely superfluous and should be done away.

It follows that the states which now require the licensing of pilots and planes have an obsolete law on their books. They cannot be blamed for having passed the law in the first place, nor is it fair to charge them with unnecessary delay in getting the law off the books now that Federal laws cover the problem. It takes time in anybody's state to change or abrogate a law. But the point is that they can be blamed if the laws continue in the future to hinder private flying. And as long as the laws stay on the books, other states will be encouraged, for revenue reasons, to pass similar legislation.

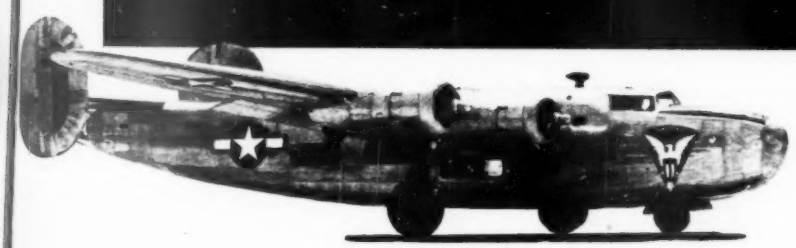
The problem can become acute. Almost all state legislatures will meet in 1947 and, almost without exception, will pass some kind of aviation legislation. Most states will have to enact enabling laws so that they may participate in the CAA airport program. They will be thinking about aviation and many of the lawmakers will see no better opportunity than now to introduce licensing laws, flying regulations, and generally expand the state licensing and registration disease into an epidemic.

Of course, anyone connected with aviation is against such laws. CAA, while neutral, recognizes that they would not only impede the progress of private flying but would compound the confusion already existing in the regulation field. The National Association of State Aviation Officials agrees and (*Continued on page* 93)

HARTRANFT'S ARGUMENTS AGAINST STATE LICENSING

1. The CAA has complete records on all licenses issued to all pilots.
2. The CAA has complete records, specifications and test results on all airplanes.
3. Cross-country flying would be enormously complicated because pilots planning long trips would have to obtain licenses in every state where they intended to land.
4. State licensing, therefore, besides impeding the efficiency of flying, would needlessly duplicate duties now performed by the Federal Government.

Plush Planes

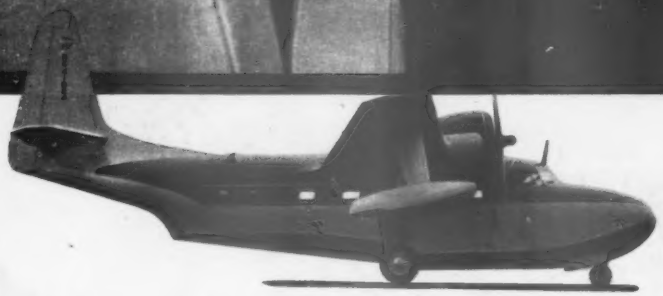


LIBERATOR 9680 was the original XB-24. The plane was later converted into a State Department luxury transport but now is used by Consolidated Vultee as a company plane. Seats are convertible into berths. Writing desks (top left) are built into the compartment bulkheads.

LUXURY AIRCRAFT OFFER BUSY EXECUTIVES A NEW TRAVEL COMFORT HIGH

TO THE average private pilot who tours the sky in a more or less standard lightplane, executive-type aircraft are out of his world in cost, appointments and just plain luxury. He calls them "plush jobs" and lets it go at that, for they are beyond his pocketbook.

Today a plush job costs upwards of $20,000 for a bare aircraft purchased from surplus military stocks. But the original cost is only the beginning. Interiors are especially designed and constructed to suit the needs and tastes of the owner.



GRUMMAN MALLARD amphibian is the newest plush plane. It carries eight to 10 passengers in its two-compartment interior. Forward section has two facing divans and aft section, four airliner-type seats. This executive plane sells for $110,000.

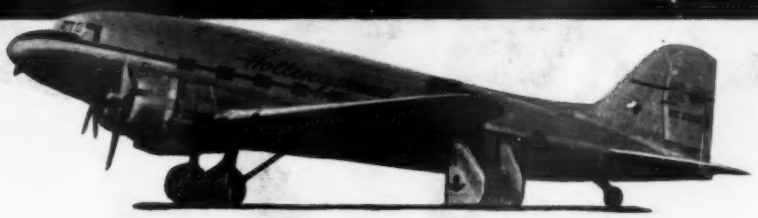
The exteriors are cleaned and polished and every nut, bolt and component is overhauled or inspected before the rebuilt craft is delivered. This means costly labor, and lots of it.

But with all their expensive, highly-trained crews, special interiors, radios and instrumentation, most of these planes pay their way. Executives using them are often paid high salaries and the time they spend in traveling is costly to their companies. But with a plush job at their beck, busy officials can leave their offices to suit their own schedules and not those of a mass transportation company. Furthermore, they can work enroute in their airborne "office."

Luxury transportation for executives is not new in the U.S. For years many companies have kept private railroad cars. But private planes are making such travel obsolete today. END

General MacArthur's Skymaster is a flying office. Seats shown here revolve 360°. Note flight instruments on bulkhead.

DOUGLAS EXECUTIVE is a custom conversion of surplus Skytrains by the Douglas factory. This plane is owned and operated by the Hollingshead Corporation to fly representatives to and from factory. Executive carries 18 passengers, crew of three.



President's "Sacred Cow" is one of the "plushiest" executive aircraft. It has staterooms, salon (below), galley and an elevator.

Lodestar conversion by Aero Services cost $115,000, has two compartments, passenger radio, interphone and table.

Grumman's 'Pussycats'

Aircraft workers fly lightplanes for $3 an hour as members of the war-baby Grumman flying club.

Club's Pussycat insignia

By JOHN H. LANCASTER

New York Editor of FLYING

TIGERCATS and *Bearcats* have replaced the *Wildcats* and *Hellcats* in running up notable records for Grumman Aircraft Engineering Corporation, but now a new species is doing its share to build up employee morale—the *Pussycats*.

A successful experiment in employee relations, the *Pussycats* are two Piper *Cubs* owned and flown by the 60 employee-members of the Grumman Flying Club in between times of building military planes and commercial amphibians.

The *Cubs* came to Grumman shortly after Arthur Romeo suggested the idea to his employers back in war-busy 1944. The Grumman bosses thought it was a good idea too, and in September they advanced $3,200 for the purchase of the club's first trainer. The loan was repaid in two weeks from initiation fees paid by the 30 charter members.

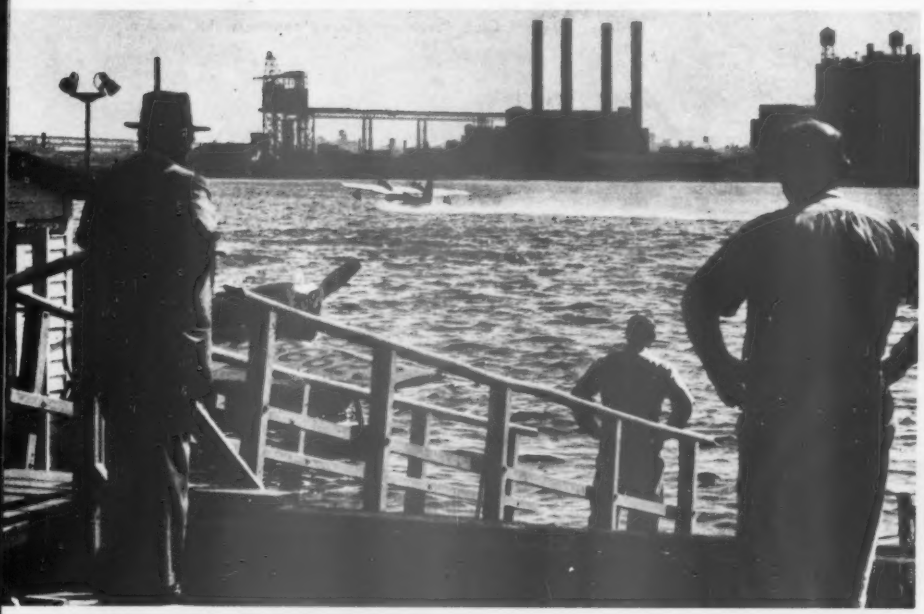
It was only natural that matters moved slowly at first because of gas rationing and other war restrictions on the industrialized eastern seaboard. By the spring of 1945, however, Grumman officials felt that it was worthwhile enough to advance money to buy two additional planes. One of these cracked up later on when a gust of wind flipped it over while two members were flying low. The remaining two *Cubs* are still going strong—at $3 per solo hour—and plans are underway to purchase a three-place plane.

An Aeronca *Chief* owned by the club instructor, George Fluhr, also is available to members. END

Meetings are held monthly in the Grumman plant to discuss business affairs. Club President Romeo conducts this session.

Club Member Ingebord Reiff gets a final word of advice from instructor Herb Crawford before taking off on her first solo. In background are Grumman buildings where club planes are hangared and maintained by members who hold mechanics' ratings.

Manhattan terminal of the new commuters' airline is the seaplane base in the East River at foot of Twenty-third Street. The base is only a few minutes by cab from either the downtown financial area or midtown shopping district. With speedier Grumman Mallards going into service, these areas will be no more than 45 minutes from the distant points of Long Island.



Widgeon take-off from East River base is an innovation in air travel which promises to open new residential areas to commuters. Long Island Airline should carry 736 passengers daily in 1947.

Family greets an East Hampton dad whose office is 100 miles (less than an hour) distant.

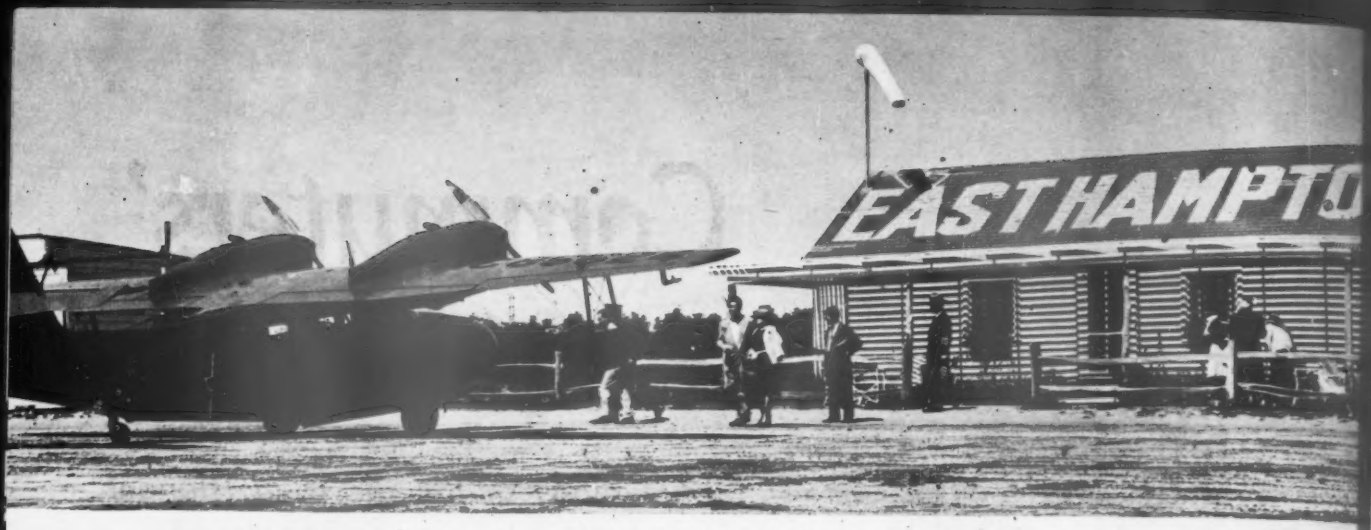
Commuters' Airline

Amphibians shuttle the Long Islander from suburban home to Manhattan office.

SUBURBANITES who live in those substantial homes on the eastern end of Long Island—in the Hamptons, around Montauk and in the smaller hamlets on the Sound—have desired speedier transportation between Manhattan and their homes for a long time. They finally got it last summer when the Long Island Airlines, Inc., was formed.

With much of its financial backing coming from Band Leader Guy Lombardo and his brothers, "America's first commuter airline" went into service last July flying four Grumman *Widgeons* on 19 round trips daily. The regularly-scheduled service reduced commuting time 75 per cent, with the longest flight (from East Hampton) requiring 55 minutes. The shortest flight takes 35

Passengers relax at the East Hampton airport clubhouse while they await take-off of next flight to New York. The twin-engined Widgeon will whisk them to the heart of the city in 55 minutes. By rail the downtown trip would require more than three hours.



East Hampton airport is most distant point served by the airline. New York fare ($8.40) will be cut when larger planes go into service. Officials plan to extend the service next year to Shelter Island, Patchogue, Bayshore and possibly Port Jefferson.

minutes. This time will be reduced further when the airline gets delivery of six *Mallards* now on order from the Grumman Company. The speed of the new planes will reduce the commuting time by about 35 per cent—and the *Mallards* carry 12 passengers, which means a sharp reduction in the rather steep tariffs of the four-passenger *Widgeons* that range up to $8.40 one way for the East Hampton fare.

Pilots on the commuters' airline are all ex-Navy flyers who logged at least 1,000 hours in flying boats during the war. Each flight serves one town, and amphibious operation eliminates long trips to and from the terminals.

Manhattan terminus of the airline is the seaplane base at the foot of 23rd Street, only a few minutes by cab from either the downtown financial section or the midtown shopping district. Though operations have been partially suspended during the first winter of its existence, the airline plans to initiate year-round service in 1947. END

Docking is handled by ex-Navy crews. Pilots are former Navy flyers who had logged at least 1,000 hours in flying boats. During winter, most of the fleet is in the Caribbean area to run similar service to Porto Rico, Santo Domingo, Haiti and Virgin Islands.

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The CAA Goes Overseas

By JAMES LEE

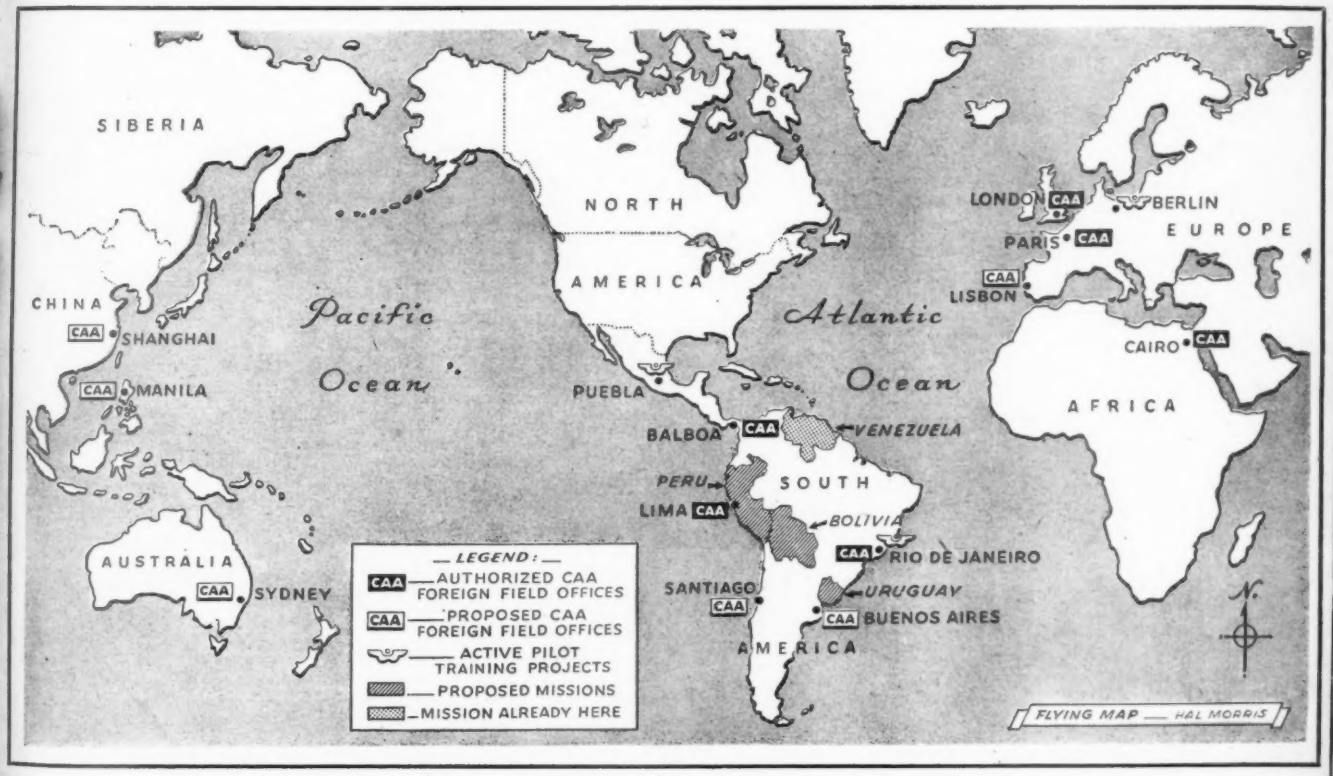
World-wide plan will aid globe-trotting U.S. pilots who make flights to foreign lands.

A WELCOME sign for all U. S. pilots—amateurs as well as professionals—is being hung on the doors of U. S. foreign offices all over the world. All Federal agencies concerned are getting up their foreign activities on the premise that pilots and air passengers alike should be encouraged to fly abroad for the benefit of U. S. world goodwill and world trade.

Most significant for lightplane pilots are global activities designed to simplify international air tours, part of the Civil Aeronautics Administration's new policy.

To carry out this policy CAA has undertaken a six-point program:

1. Directives have been sent out to all continental U. S. regional and district offices instructing CAA workers to co-operate fully with lightplane flyers seeking information and clearance for a trip abroad.
2. Border offices have been specifically alerted.
3. CAA expediters are co-ordinating their program with the State Department.
4. CAA foreign representatives have been instructed to be of all possible service to private pilots visiting a foreign country.
5. Foreign representatives are also authorized to take care of regulations requirements for U. S. nationals and their planes.
6. Widespread negotiations, in which CAA foreign experts are active, are going (*Continued on page* 80)



Map shows the CAA offices, missions and projects now maintained, and facilities to be established in the near future.

Aviation's Best-Sellers

Charts are checked regularly from the air by crews from the Coast and Geodetic Survey and the CAA to guarantee accuracy.

Uncle Sam sells more than 4,000,000 of the world's most accurate air charts every year.

By JOSEPH BORS

International News Service, Washington, D. C.

THOSE sectional charts used by all U. S. airmen on cross-country flights have, in their 24 years of development, become the most accurate navigational aids available to any traveler.

The responsibility, successively, of the military and private enterprise, the charts are now the product of the Coast and Geodetic Survey Bureau of the Department of Commerce, where a force of several hundred draftsmen, lithographers and reviewers are constantly revising and correcting them.

This topographical Topsy began in 1922 when the Army and Navy decided their pilots had to have better maps than those ripped out of an atlas or Junior's geography book. The Army ordered its map makers to turn out "strip maps" of the routes most often flown—a project which produced 57 maps during the next eight years.

The Navy, then confining most of its flying to shoreline routes, made several hundred charts of the coastlines of North and South America. For a time Rand McNally attempted to put out specially-designed charts for airmen but found the market too small and costs too high.

Now the Coast and Geodetic Survey has a money-losing, air chart monopoly. Each edition of the charts costs several thousand dollars to produce and your 25c a copy doesn't begin to foot the bill.

Coast and Geodetic Survey took over the job in 1927. The first chart was a strip map of the airline route from Kansas City, Mo., to Moline, Ill. Through the years more and more charts were completed and by the middle 1930s the entire U. S. was mapped. Flight checks were instituted to check and re-check chart markings and gather new information to be incorporated in future editions. Now, a new corrected edition of each of the more than 200 domestic and Alaskan charts is published every six months.

Today almost anyone can request a chart change. A new airport, for example, is opened at Elgin, Ill. The operator wants to make sure that it is on the next chart and writes to the Civil Aeronautics Administration, Office of Aviation Information. This office, in turn, informs editors of the *Airman's Guide* (that is what the former *Weekly Notice to Airmen* is now called) who print the information in their booklet.

Culling information from the *Airman's Guide*, CAA teletype communications, and other official publications and reports, the cartographers note the major changes necessary. With this starts a series of mechanical steps which end in a new, revised chart, including among other changes, the new Elgin airport. However, changes occur so fast that it is rare for a chart to be 100 per cent accurate at the time it is placed on sale. For this reason, the Coast and Geodetic advises the cross-country pilot to consult the *Airman's Guide* for the more recent changes.

Work doesn't stop on the ground. Coast and Goedetic aerial observers check the maps from the airman's viewpoint. The survey plans to make these flight checks a yearly feature, not only checking for the 87 sectional charts (or basic series) but also for a new series of local charts. Other flight checking, primarily of navigational facilities, is underway constantly by CAA.

Seven to 12 colors are used in the present sectional and world aeronautical charts. Black is for projections, names, bridges, etc.; blue indicates water; yellow, cities; red, aeronautical information; and three greens and five browns indicate gradients.

Some pilots complain that the charts, while excellent topographically, don't show what (*Continued on page* 77)

Constant corrections are necessary to keep charts up to date from the steady flow of new information which is channeled to the map makers. Here C. A. White of the Coast and Geodetic Survey makes corrections indicated by Airman's Guide.

Chief CAA Patrol Pilot Randolph Mulherin (facing camera) reports chart errors to J. H. Kelly of Coast and Geodetic.

Final stage of chart making is handled by this automatic machine which folds the maps into convenient form for pilot use.

Corsair echelon is flown by members of Marine Squadron 121 (fighter-bomber unit credited with 209 Jap planes during the war in the Pacific) which is stationed at the Naval Air Station, Glenview, Ill. Tail-stripe is new identification for reserve planes.

Map shows location of the 21 Naval air stations where Marine air detachments are receiving refresher training in fighter-bomber tactics. Six additional Marine units will be activated soon.

THE Marine Air Reserve

Marine training program is set up to provide 24 war-seasoned squadrons on 10 days notice.

By JOHN W. THOMASON

THAT squadron of gull-winged *Corsairs* operating out of the Naval Station near St. Louis on alternate weekends was one of the crack wartime Marine Fighter Squadrons. Its battle history runs from the Marine Air Station at Ewa, Hawaiian Islands, on December 7, 1941, to the Kamikaze splashing campaign off Okinawa in the spring and summer of 1945.

But the "Fighting Falcons," as this particular squadron calls itself, reports these days not to COMSOPAC but to COMMART (Commander of the Marine Air Reserve Training program), Brig. Gen. Christian F. Schilt. And it is but one of 21 such squadrons which at present comprise General Schilt's six-months-old training command. One of these is the first of four Marine Ground Control Intercept (GCI) squadrons—radar-equipped, air-warning and fighter-director units—to be commissioned. In the near future, three more flying squadrons and three additional GCI units will be commissioned to bring COMMARTs' country-wide command up to full peacetime strength.

With an aggregate paper strength of 1,086 pilots, 361 aviation ground officers, and 4,575 enlisted marines, the MART command already has applicants for more pilot billets than its allowances permit. Meanwhile, Marine Reserve pilots all over the country are reporting on alternate weekends to the 21 reserve air bases for flight training.

The program was initiated last spring when a group of Marine lieutenant colonels and majors set up Marine Aviation Detachments at the 21 Naval Reserve Air Stations. Twenty-one fighter-bomber squadrons equipped with late model *Corsairs* were commissioned in the reserve during the first week of July and the remaining six units will be organized at the stations having the greatest number of applicants from the (*Continued on page* 94)

COMMART Brig. Gen. C. F. Schilt (left) confers with Maj. R. S. Ingram, C.O. of Squadron 121, at Marine office, Naval Air Station, Glenview.

Reserve pilots of Squadron 121, top scoring Marine air unit of World War II, are briefed by operations officer on spare-time flight routine.

Lightplanes

William H. Lee, a fighter pilot in World War I, checks far-flung operations of his Mid-States Transport Corporation in a Cessna 140.

By CLINTIE KENNEY

ONE day last month 100 lightplanes landed at Washington National Airport in a 10-hour period. Their owners were insurance salesmen, engineers, oil and lumber men, attorneys, all of them businessmen who had found how much airplanes speed their work.

These businessmen-pilots bear out a trend already noted in a recent survey conducted by the Aircraft Owners and Pilots Association which concluded that "business use of AOPA aircraft is the greatest ever reported." Since AOPA pilots own more than half of all civilian non-scheduled aircraft in America, the figures are representative of the national picture.

The AOPA results are confirmed by the Civil Aeronautics Administration and the Aircraft Industries Association which has noted a "tremendous increase" in planes bought or being used for business.

A 100 per cent upswing in use of planes for business since the end of the war is estimated by Hervey Law, manager of Washington National Airport, who says:

"We've just scratched the surface . . . we're going to have to start another airport for private flyers."

A combination of business and pleasure account for 67 per cent of all AOPA plane usage, according to the survey. For every 14 AOPA planes used primarily for pleasure, another 11 are used primarily for business.

The range of businesses is as broad as the horizon. Most AOPA pilots say they use their planes for sales and service jobs. Farming comes second with about half as many votes. Other types of businesses mentioned, in order of frequency, are contracting, oil operations, engineering, insurance, real estate, ranching, aircraft and automotive engineering, medicine, newspaper work, law, lumbering and miscellaneous manufacturing.

The survey notes a trend toward bigger, faster planes.

For Businessmen . . .

Flying your own plane is an investment, say these businessmen. It speeds operations, has prestige value, saves travel expense.

Particularly on a second purchase the buyer will tend to pass up the trainer-type plane for a higher performance aircraft with better passenger and baggage accommodations.

Why are businessmen, many of whom never flew before, becoming plane owners?

They've got a unanimous answer—it's good business. It speeds up operations, has prestige value and shows up well from the standpoint of dollars and cents profits at the end of the month.

Take the case of Don Pruess of Richmond, Va. A distributor for Eversharp pencils and in his late 30s, Pruess had never flown. His wife had been a private pilot but gave it up when the first young Pruess arrived. Pruess bought an *Ercoupe* and learned to fly, soloing after five hours of dual instruction.

His sales procedure all over his territory from Virginia to New Jersey runs like this: He telephones his prospect, "I'll be over in about 45 minutes. Meet me at the airport." The prospect gets an air ride, along with a sales talk, and the results are duly gratifying.

In Chicago another business man, Clifford Waterman, uses his *Ercoupe* to help him sell coal processing machinery. As mid-western division manager of the Pittsburg Manufacturing Co., he has to travel extensively throughout the central states.

Waterman, like many businesmen-pilots, is new to aviation. Prior to last spring he had ridden in a few airplanes and handled the controls. Then he bought the *Ercoupe* and was licensed last August. Today his average mileage is 5,000 per month at a cost of 3.7 cents per mile. This figure, lower than the operation of his automobile, includes maintenance, tie-downs, fuel and insurance.

Waterman's reason for owning an airplane, outside of the actual economy, is "because I can spend half again as much time in the office." He says that since taking up coal operators to see their fields from the air, many of his clients have made plans to buy their own planes.

Mrs. Waterman uses the family plane when her husband is in Chicago and she too has her private license. She accompanies him on trips and all cross-country flying time is split between them.

Waterman isn't the only businessman-pilot who had only a nodding acquaintance with an airplane cockpit before last year. A. J. Roberts, owner of the Roberts Towing Co., in Paducah, Ky., had never flown before. An ex-tugboat captain in his middle 60's, Roberts bought a plane in May and learned to fly within a month.

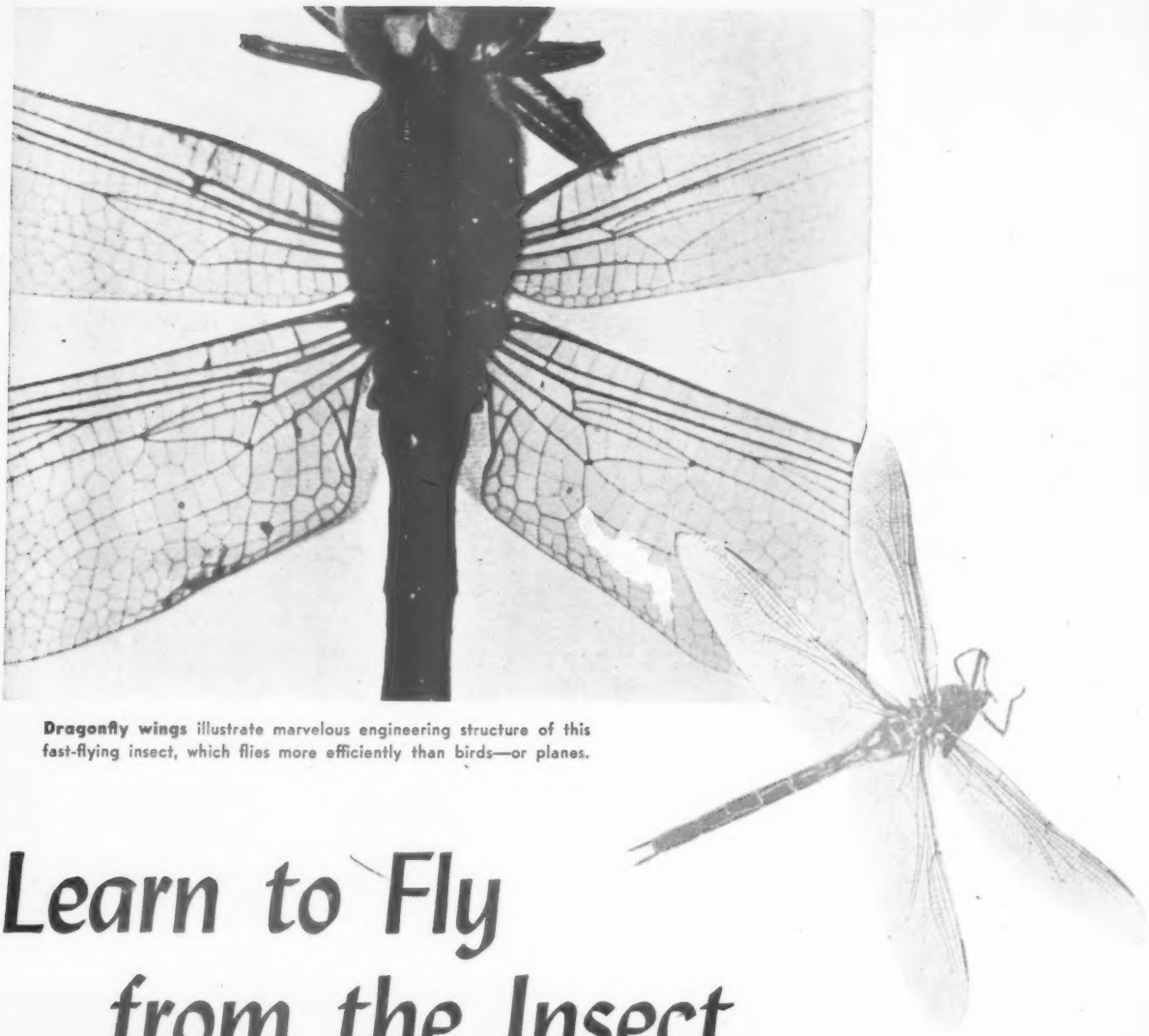
Now he flies up and down the Mississippi River. When he sights one of his barges, he circles the craft and signals the captain. Then he lands in a nearby field and his captain rows in for a conference. Roberts never before had found any successful way of keeping in communication with his barge captains. Flying solved his problem.

Then there's the matter of economy. Jack Nelson, president of the Aero Club of Washington and head of Servair Aviation Corp., claims his business trips are 1/3 less expensive when he flies than when he drives his partner's Cadillac!

Here's how he figures it: On a (*Continued on page* 62)

Clifford Waterman, sales manager for equipment company, often takes Wife Patricia and Dog Smoky on business flights.

Earl F. Ronnerberg, industrial designer and architect, finds his Super Cruiser a "time saver." He flies it an average of 5,000 miles each month.



Dragonfly wings illustrate marvelous engineering structure of this fast-flying insect, which flies more efficiently than birds—or planes.

Learn to Fly from the Insect

By WILLIAM B. STOUT*

Forget propellers, advises Detroit's brilliant and unorthodox inventor. A new field of aerodynamics lies in studying insects.

A NUMBER of years ago I watched a dragonfly darting here and there in the air, catching mosquitoes on the wing, standing still, backing up, dropping vertically, or rising much easier than a helicopter. When it started forward it had an acceleration beyond the ability of the eye to follow.

No ATC, no CAA, no superman mathematics—just a bug but it had something we haven't got!

Get this straight: this article will not design or propose a new flying machine. I am merely trying to establish a new approach and to show some methods of aerodynamic research—and, perhaps, some results already obtained.

**This article is an adaptation from Mr. Stout's paper, "A New Approach to the Flight Problem," presented at the National Fall Aeronautic Meeting of the Society of Automotive Engineers.*

In order to get some groundwork on insect flight, I went to the Congressional Library in Washington in an attempt to locate some of the engineering of the insect. In all the files and rows of cases of cards, there was not one indication of any publication dealing with the mechanics of insect flight.

Later I found that Prof. Leigh Chadwick had been taking some very interesting movies of insects flapping when held by forceps, and also in flight. Professor Chadwick, with stroboscope, was able to count the vibration of wings; dragonflies doing 30 beats per second, and house flies and bumble bees up to 300 per second!

I ran across a bee keeper, who told me that by putting a 60° landing board in front of his bee hive, instead of the

old flat board, the bees came in with a 30 per cent greater load of honey. When the bee comes in, he is flying at pretty well a stalling angle with his loading. If he lands on a flat board, his hind legs land first and his front legs slap down and break off. If he lands on a slanting landing board, all six feet land at once; hence, 30 per cent more payload.

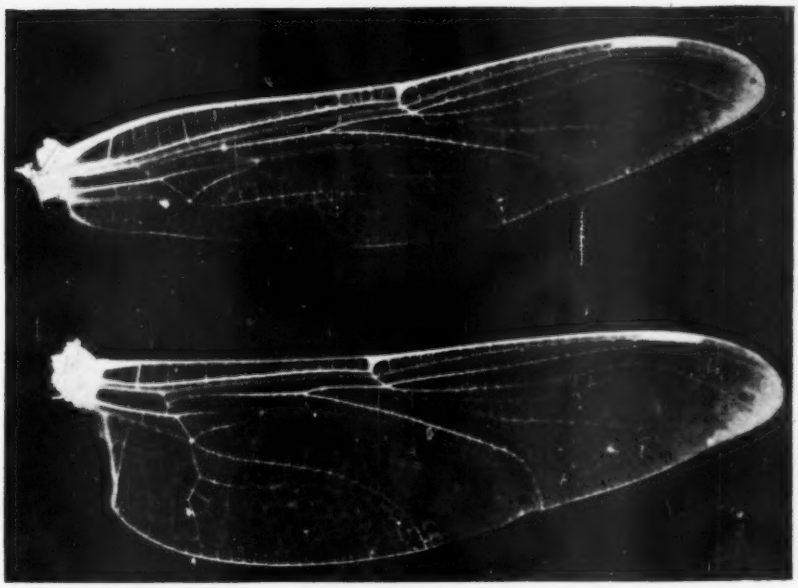
And so through the years of inquisitiveness I began to build up tremendous interest in flapping bugs. I desired to build myself a *"Geflopigus Giganticus"*—a flapping wing—a bug pinion—and see what happened.

Before going further, however, I would like to follow a little analysis which came along naturally in studying different insect wings of creatures which pestered me flying around my little workshop: big house flies, a couple of hornets, and a bee, dragonflies, an ant lion with its four wings, and two ant lions hooked end to end, flying about as a tandem octaplane and apparently enjoying life without any inhibitions.

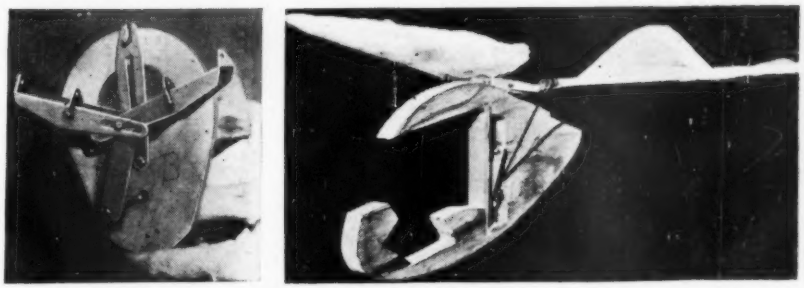
I looked at flies' wings under small microscopes, and from the art standpoint developed a lot of drawings to simulate the kind of a structure man would be able to build with his present knowledge to fit the type of structure required in a fly's wings.

Since the house fly was the simplest, and virtually a single-winged creature, experiments were started with a single wing. Not, perhaps, because it

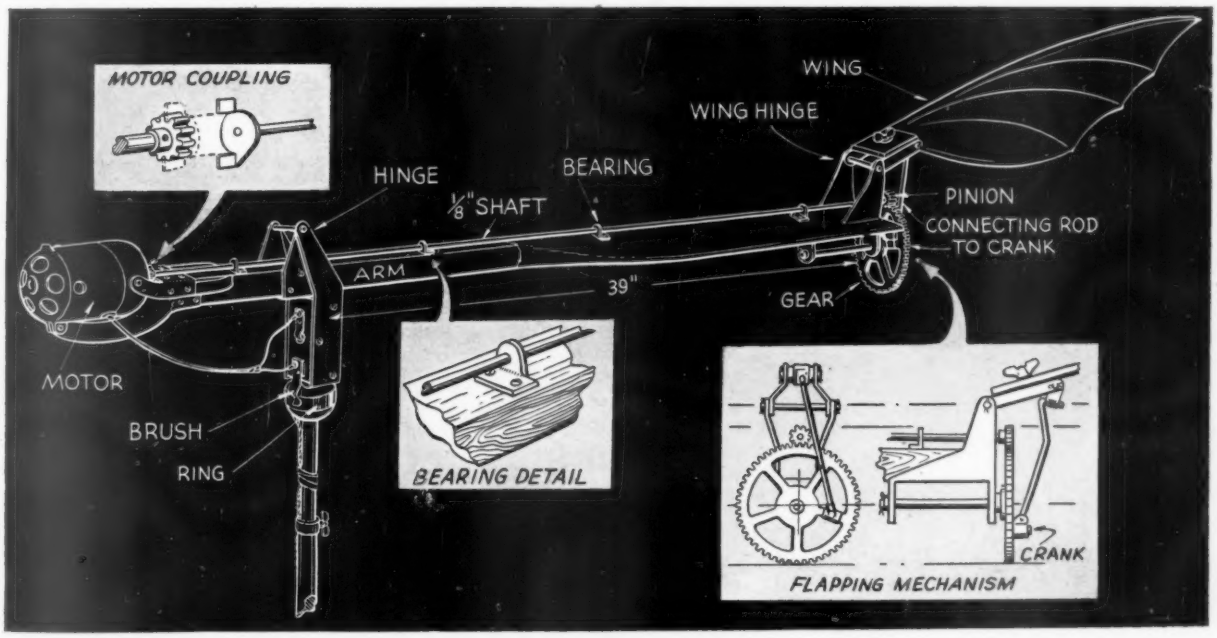
(*Continued on page* 64)



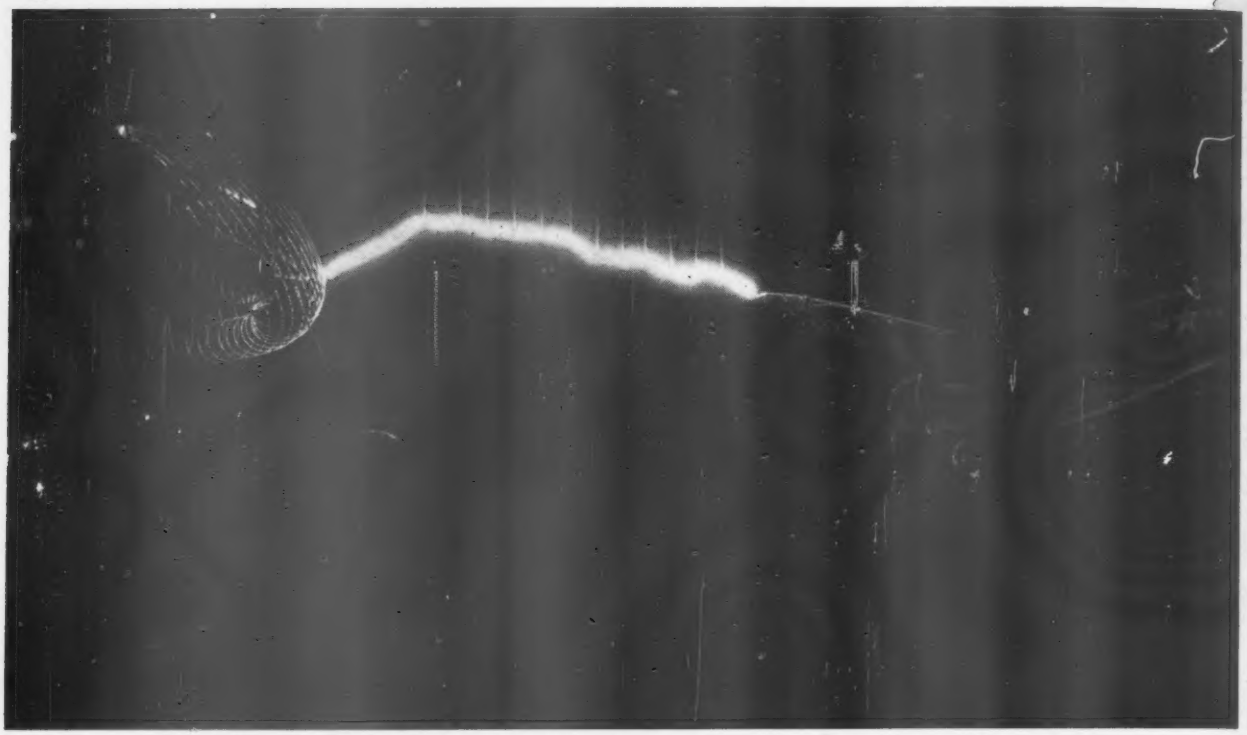
Dragonfly wing structure has stiff leading-edge spars growing more flexible toward tip.



Twin-wing flapping mechanisms devised by author for test purposes allow for variable strokes on either side (left above) and for pivoting the wings, as illustrated on right.



Stout's "Geflopigator" is a mechanism to test the efficiency of various insect-type wings. He proposes that amateur aerodynamicists standardize on a similar approach. Powered with an old vacuum-cleaner motor, the arm whirls as the wing flaps.



Man-made lightning, this 1,200,000-volt charge helped Army-Navy to reduce effect of precipitation static on aircraft radio.

STATIC and the Airplane Radio

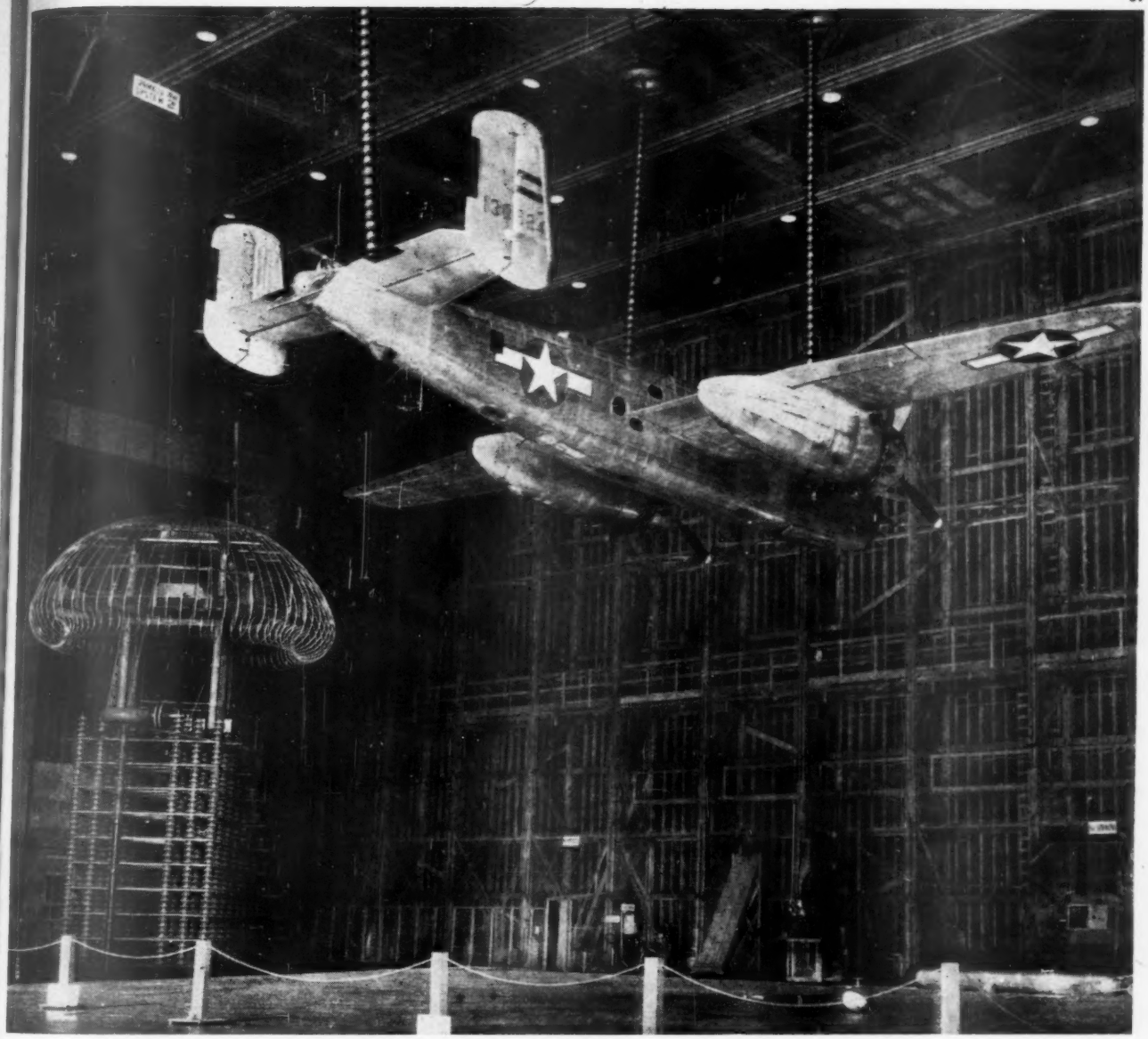
"Whips," made of plastic-covered cotton rope impregnated with silver compound, are placed on the tips of wing and tail surfaces to speed the discharge of aircraft radio static.

By J. WILLIAM WELSH

THOSE SCREAMS and catcalls that disrupt aircraft radio during a rain or snow storm have been beaten to a whisper by joint Army-Navy research, recently removed from the secret list. One of the gadgets has been used successfully on the President's plane, "The Sacred Cow," and the promise is that others will be standard equipment on most airliners as well as lightplanes of the future.

The horrendous noises in the earphones is precipitation static, an electrical disturbance caused to radio reception by rain, snow and like phenomena, including St. Elmo's fire. Airmen have sought its cure since 1929 when the Navy's dirigible *Los Angeles* served as a testing laboratory.

Dr. Ross Gunn, head physicist at the Naval Research Laboratory, and his fellow-workers found that rain-and-snow static is separate in sound effect, as well as in origin,



In laboratory setup for study of aircraft radio static, Mitchell bomber was suspended from roof of Navy Air Station hangar, Minneapolis. Insulated from contact with hangar, the plane picked up simulated precipitation static from giant generator at left.

from static provoked by lightning. The former results from charged clouds or particles in the air striking an aircraft, causing excess static electricity to build on a plane's surface. This accumulation of electricity discharges into the surrounding air and results in the malfunction of radio sets.

Flame, known as St. Elmo's fire, appears along the lines of discharge, such as trailing edges of wings and tail, pitot tubes, antennae, and propeller tips.

St. Elmo's, believe it or not, never touches the plane. It's just off the aircraft and does no physical harm. Precipitation static's danger lies in the blocking out of radio transmissions. Intensity of the disturbance varies with the speed of the plane and the amount of precipitation or area of electric field incurred.

Small static charges accumulated by an aircraft in a clear atmosphere are negligible. In an area of precipitation, however, three conditions may produce enough electricity accumulation to warrant corrective action. One, friction caused by striking pellets of rain or snow; second, striking particles divided into charged fragments upon impact; and third, drafts in the electric field associated with thunderstorms. It was the problem provoked by these three conditions that Dr. Gunn attacked.

Worst static on long flights is in northern areas and work was centered on Northwest Airline's route between Minneapolis and Fairbanks, Alaska, with a laboratory at the Naval Air Station at Minneapolis. Here the scientists set up a giant generator in a hangar, and daily shot a 1,200,000-volt current across 20 feet of space to a multi-engined aircraft. Result: severe precipitation static. Next step was to lick it, and this was done by applying dry wick dischargers to the plane.

Located along the outer and (*Continued on page* 82)

Lessons from the Liaisons

The Grasshoppers' wartime operations record can point the way toward safer lightplane flying in the future.

By WILFRED OWEN

WHEN lightplanes joined the Army shortly before Pearl Harbor they didn't look very much like warriors. But they soon proved that you don't have to be big and tough to win medals.

Privates Vultee, Taylorcraft, Interstate, Aeronca, Piper and Stinson were their names. They were examined by the Army and promptly classified as liaison aircraft because, from their civilian records, it looked as though their most useful function would be to provide communication between air and ground commanders. But as Army classification often goes, the liaisons were not too expertly screened and it wasn't long before they were demonstrating remarkable proficiency in a lot of other jobs no one thought they could do.

The artillery found them to be excellent to direct fire. Others were used for carrying cargo and evacuating casualties. They dropped and picked up messages on the front lines and they developed valuable techniques for reconnaissance and aerial photography.

When they got into the fighting war, the L-type aircraft achieved glory in operations far beyond the call of duty. Ir the airborne invasion of Burma they were the first to follow the gliders in; and before airstrips could be made ready they had carried out a thousand casualties with complete contempt for the nearby Japs. In Italy they flew all the important messages between Anzio and 5th Army headquarters. In all parts of the world they dropped parapacks of food and supplies to isolated troops and maintained constant patrol over enemy lines in defiance of enemy fighters. Often, in fact, they were able to outwit their "superiors" in the air by reason of their remarkable maneuverability, leading enemy aircraft over ack-ack positions and then high-tailing for home while friendly guns shot up their adversaries.

The liaison planes are now (*Continued on page* 84)

Stinson Sentinel on routine mission. Such low flying was a must for liaison aircraft — but the statistics show it is dangerous even for expert pilots.

Taylorcraft Grasshoppers flew over 400,000 hours in the U. S. during the war. Tandem plane was powered with a 65-h.p. engine.

Vultee Vigilant had 300-h.p. Lycoming engine, was the largest liaison-type used in war. Wing permits near-hovering speed.

Piper Grasshopper is virtually same 65-h.p. Piper Cub which is used at many U. S. fields for flight training. In the Army it has a two-way radio and is used for artillery spotting. Its enlisted pilots dubbed plane the "Maytag Messerschmitt."

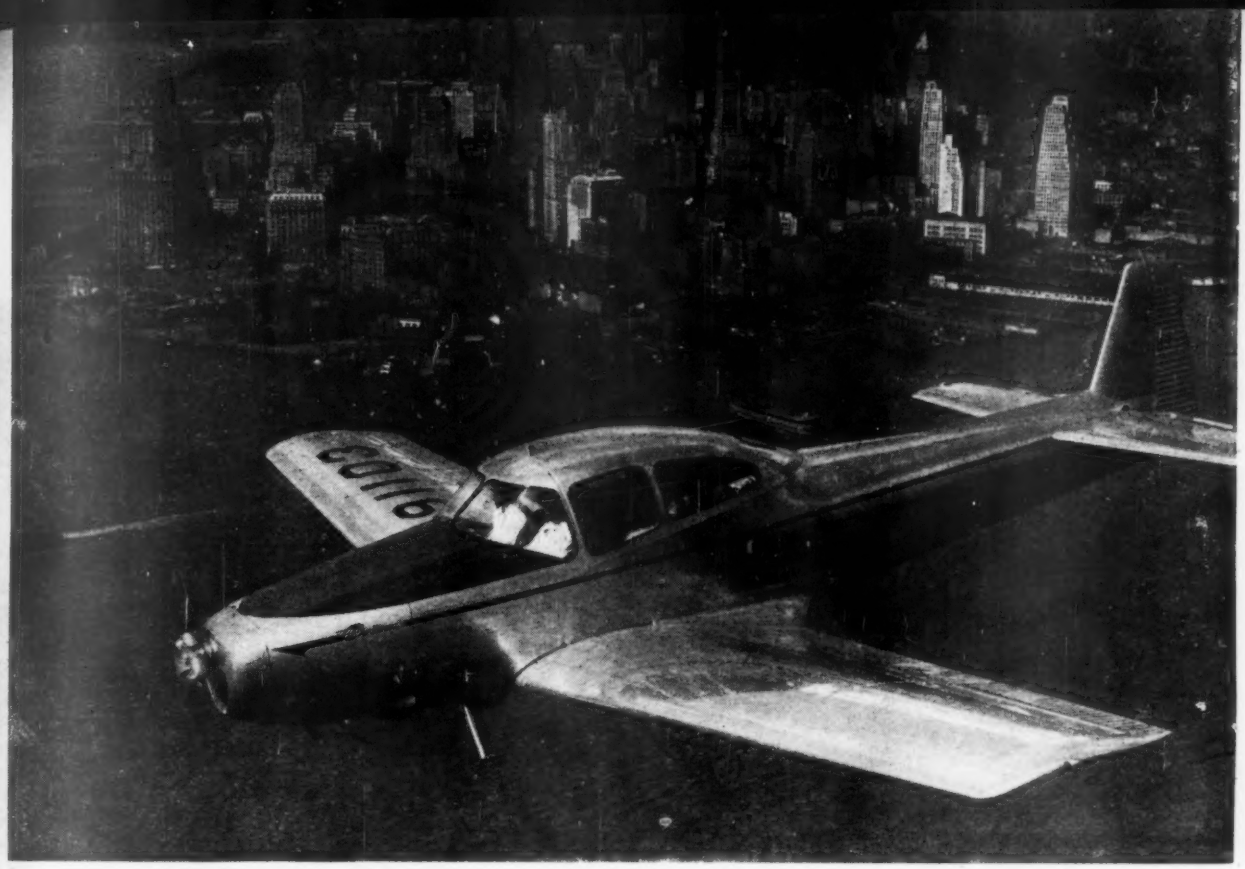
Aeronca Grasshopper is similar to post-war Aeronca Champion. It has a 65-h.p. Continental engine and 79-m.p.h. cruising.

Interstate Grasshopper cruised at 105 m.p.h. on 115-h.p. Franklin engine, is basically same plane as Interstate Model A-1B.

This instrument panel is standard except for sensitive altimeter, turn-and-bank, clock, radio. Flap and gear handles left of throttle.

Mustang-like tail is all-metal, including surfaces. Only elevator tab can be controlled from cockpit. Steel tail bumper is under rudder.

Controllable propeller is standard equipment, landing lights (on wheel leg) are not. Nose wheel retracts partially.



Excellent visibility is had in all directions. Note fixed step behind and under engine, and semi-retracted nose wheel.

THE *Navion*

FLYING's CHECK PILOT

EDITOR'S NOTE

This series of articles is planned to help the pilot and prospective plane owner evaluate aircraft now on the market. Only aircraft holding a CAA Approved Type Certificate are flown. The author is not a professional test pilot. He evaluates each aircraft through the eyes of an average private pilot who flies an airplane either for business or sport.

THIS is North American's entering wedge into the personal plane field. As entering wedges go, this one is a whopper. The *Navion* (pronounced NAY-vee-yon) has most of the things a 1946 personal plane should have. It's a pilot's delight, with a wide performance range. Its large, roomy cabin should fascinate milady. The inexperienced, ham-handed pilot should take its many safety characteristics to his heart.

Of course, the *Navion* really is not a personal plane in the most common definition of the term. It is four place, all metal, has 185 h.p., and costs $6,100 standard, at the factory. Radio, landing lights, better-than-average instruments all cost extra. That's about 20,000 feet above the pocketbook of the average private pilot—the salesman and the office worker who has to budget a few bucks every week to keep his hand in. While this type of fellow obviously is not sweating-out delivery of a *Navion*, there still is a surprising number of sportsmen- and businessmen-pilots who have ordered or want to order an airplane in this class.

I was only able to fly one airplane for this article. It was *Navion* No. 12, owned by Rex Howard of Peoria, Ill. (Chicago-area distributor for North American). The plane had been flown nearly 200 hours as a demonstrator. With that amount of tough demonstration flying behind it, (*Continued on page 60*)

REPORT FROM WASHINGTON

By FRED HAMLIN

WITH THE XS-1 making current history, putting the *Shooting Star* in a sort of supersonic putt-putt category, we had a visit the other day with one of the P-80 experts to see if we could pick up a few sidelights on the care and feeding of jets. The expert was Maj. Clay Albright, 28, who commanded the 460th "Black Ram" Squadron in the Pacific, and recently completed a 10-week course in jets at Williams Field, Ariz. We gathered that the *Shooting Star* is, after all, pretty hot. "Keeping it under the speed of sound is one of the great problems," said the major. There is a marker on the instrument board to warn when sonic speed nears but Albright found that you don't have to use it. Supersonic gremlins are on the job. "You begin to hear and feel little tap-tappings on your wings." P-80 trainees found that heavy emphasis was placed on physical condition and youth. "Old" men at the school were 33. A pilot of 40, even though in perfect condition, would be "too old for the reactions and eyesight necessary," Albright believes. He would fly the XS-1 "for nothing" under orders, he said, making sure before take-off that it was equipped with a catapult seat and special chute, but to fly it as a commercial test pilot, he estimated, would be worth "a million dollars."

Hot Planes

Albright's million dollar estimate may not be unreasonable at that, when some of the problems encountered in flying supersonics like the XS-1 are considered. Most difficult being pondered by the engineers these days is not whether they can get an engine that can go at these speeds, but designing a plane that can take it and not roast the pilot to death in the process. We asked John F. Victory, executive secretary of the National Advisory Committee for Aeronautics, about this the other day and he classed it as one of the top problems. "Supersonic speeds create tremendous heating action by air friction against the wing and fuselage," he pointed out. "Heat in the cabin of the *Shooting Star* reaches 50° higher than the outside air at 550 m.p.h. and we estimate that at the speed of sound a rise in temperature of 150° will be reached. At twice the speed of sound there will be an increase of 360°—exceeding the limits of human endurance." With planes like the XS-1 the latter speed is, of course, not out of the realm of possibility. It is also not impossible that this friction heat might have been a deciding factor in the explosion of the British *Swallow* (DH-108), which killed Geoffrey De Havilland. . . . Whatever the result in the supersonic field, Albright is sure of one thing: "All fighters except the jets are obsolete and the same will soon apply to bombers."

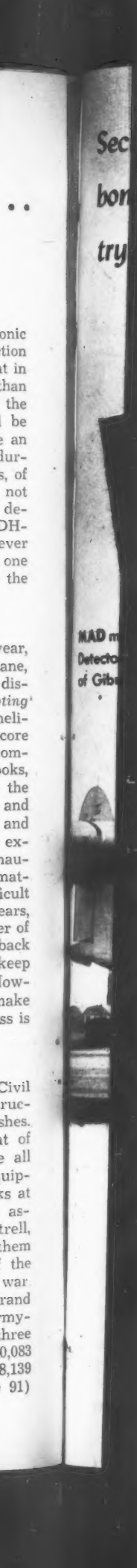
High speed of Lockheed Shooting Star heats cabin 50° higher than outside air. This heating by air friction is expected to be one of major problems in successful supersonic planes. At sonic speeds, a temperature increase of 150° is expected.

Record Breaking

The way the AAF has been breaking records this year, one gets the idea that all you have to do is take a plane, pick a record, and bust it. The planes to pick, we've discovered, are four: Boeing's *Superfortress,* the *Shooting Star,* the Douglas *Invader,* and Sikorsky's R-5A helicopter. Among them, they had topped some two-score records during 1946 and the year's total hadn't been completed. . . . But record-breaking isn't as easy as it looks, even after you've picked your plane—and even if the plane's a putt-putt. Highly technical static tubes and barographs have to be installed before your take-off, and all equipment, plus your flight, must be okayed by experts working under auspices of the National Aeronautics Association, which keeps the scoreboard on such matters for the U.S. flying world. It's a long and difficult process and it hasn't been shortened in recent years, when NAA experts, including Charles Logsdon, keeper of the records, were off fighting the war. Logsdon is back now, but catching up with old records and trying to keep up with the new ones keeps him going overtime. However, if you want to break a lightplane record and make it stick, he's the man to get in touch with. His address is 1025 Connecticut Avenue, Washington, D. C.

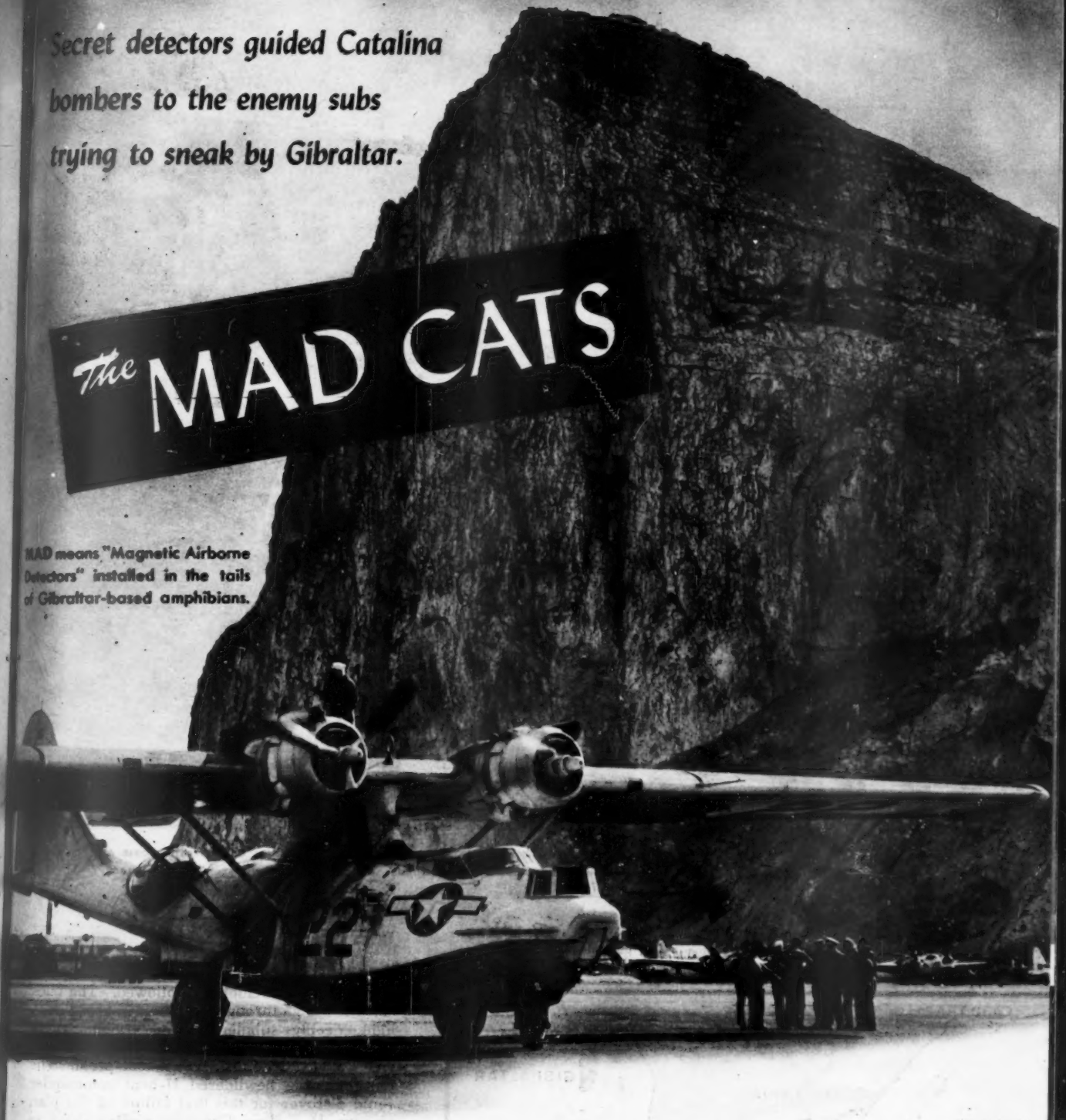
Douglas

The other day we checked on a rumor that the Civil Aeronautics Board was investigating DC-4s for structural faults following two spectacular recent crashes. Board officials denied that this was true—said that of course the crashes were being investigated, as are all crack-ups, but that no investigation of Douglas equipment generally, or any of its parts, was on the books at this time. . . . Few days later we received further assurances from our west coast editor, Gaither Littrell, who had interviewed Douglas officials and found them puzzled and saddened by the accidents in light of the safety record Douglas planes hung up during the war. DC-3s and DC-4s, the statistics show, made a grand total of 80,394 long hops for ATC, the Navy, and Army-Navy contractors between 1942 and 1945 with only three losses of aircraft in transit. The total includes 40,083 transpacific flights, 32,172 transatlantic flights, and 8,139 over-water flights. All trans- (*Continued on page* 91)



Secret detectors guided Catalina bombers to the enemy subs trying to sneak by Gibraltar.

The MAD CATS



MAD means "Magnetic Airborne Detectors" installed in the tails of Gibraltar-based amphibians.

By JAY du VON

Former air combat intelligence officer of Patrol Squadron 63

THERE was no warning. One second the German submarine U-761 was proceeding in tomb-like quiet, deep in the waters of the Strait of Gibraltar. The next instant there was an ear-splitting blast, crew members were dashed into heaps, water roared into the engine room. Capt. Von Geider, commanding officer of the U-boat, knew his sub was doomed but he steadied himself for the attempt to surface and save the lives of his crew members. Minutes later Von Geider and 47 of his crew were hauled aboard *H.M.S. Wishart*.

Thirty-five other German submarines had preceded the U-761 into the Mediterranean since the beginning of the war. Most of them had accomplished the feat under the same sail-

Navy Mad Cat crosses La Linea, Spanish town where German consulate had excellent view of Squadron 63's operation base at Gibraltar air strip. But not even the British knew how those 30 rocket bombs (under wings) were fired with such lethal accuracy.

The planes closed the Mediterranean to submarines by patrolling the shipping channel continuously at its narrowest point outside three-mile limit.

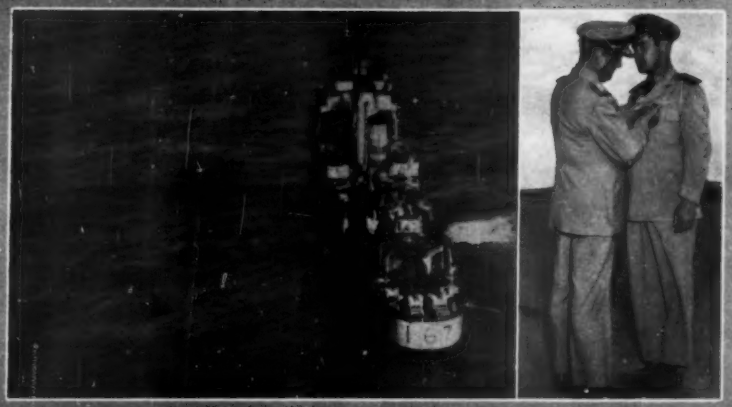
ing orders Von Geider had followed. The trick had been to go through the Strait in broad daylight, deeply submerged and crawling with slowly-turning propellers. It had worked so well that the Nazis thought it fool-proof. The only clue the bewildered U-boat commander could discover for this first failure of the plan was two U. S. Navy *Catalinas* circling above as he and his dripping crew were herded below the decks of the British destroyer.

Closer examination of those *Catalinas* would have disclosed strange "stinger-like" projections from their tails and 65-pound rocket-bomb installations (30 to each plane) placed in a backward-firing position under the wings. Use of those stingers and bombs gave the U-761 the dubious distinction of being the first U-boat to run into the impenetrable "aerial fence" our Navy had thrown *(Continued on page 74)*

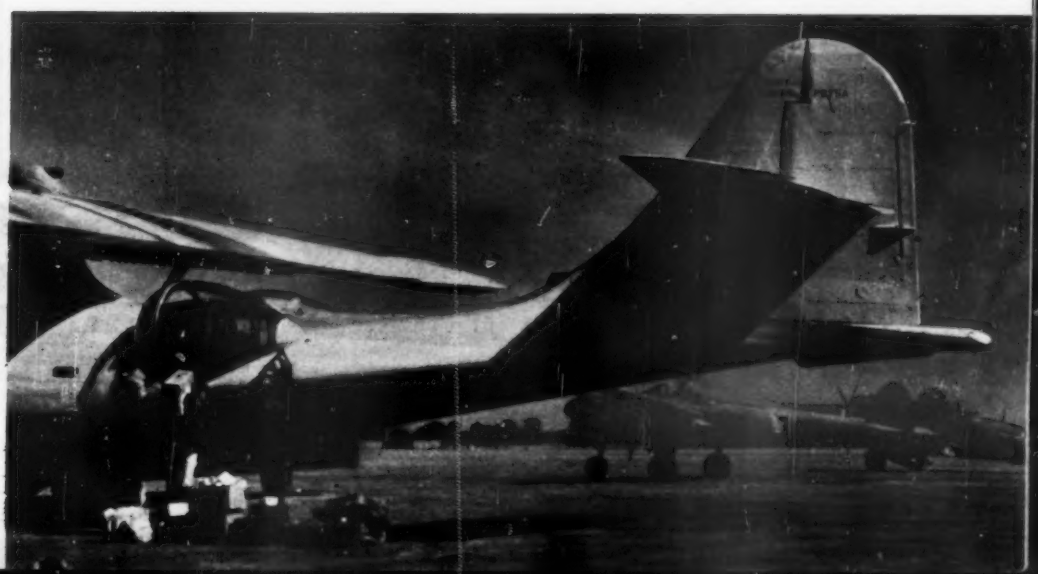
THE MAD CAT'S FIRST KILL

British destroyers, acting actively after Mad Cats had made first contact, impeded strike temporarily by steaming into suspect area and disrupting search.

The U-761 breaks surface, mortally wounded. After British destroyers were called off, Mad Cats made new contact and bombed the U-boat successfully.



Survivors are picked up by H.M.S. Wishart after U-boat commander scuttled his craft. At right, Lieut. T. R. Wesley, Jr., is awarded D.F.C. for sinking the sub.

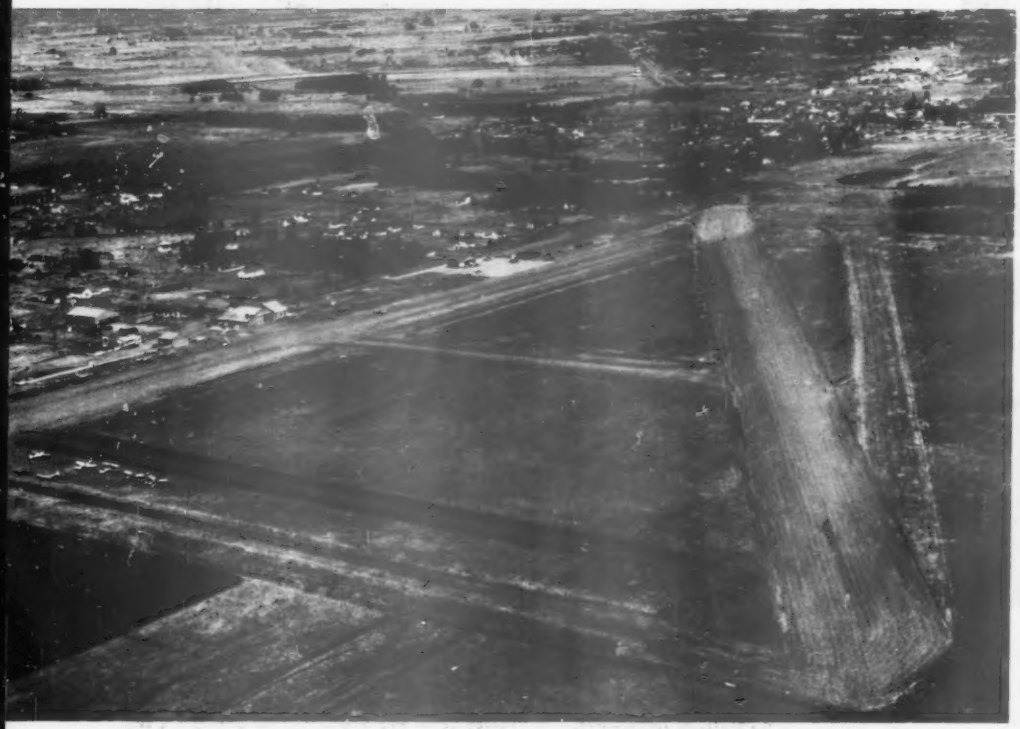


"Stinger" projecting from Catalina's tail contains the magnetic detector equipment which located submerged enemy craft and automatically released rocket bombs. The bombs were discharged to the rear at a speed equal to that of the plane so that they dropped straight down upon their submerged targets.

AIRPARK BY LAW

By DEWEY F. RAY

City Manager Deane Seeger helped to promote the Eugene airpark plan.



Airpark runways are ample for small plane operations—2,600 feet NW-SE and 2,430 feet N-S. Gravelled now, they will be paved later.

Two Cubs and Globe Swift are typical lightplanes using Eugene's airpark. The field is devoted primarily to lightplane flying activities.

A city ordinance gave Eugene, Ore., a new airpark and a unique means of operating it.

WHILE other towns and cities throughout the country made up vast blueprints, many of them too fantastic to be realized, Eugene, Ore., took an old "white elephant" that the city had owned for more than 25 years and converted it into a modern airpark.

A fancy layout and extensive installations are not what makes the Eugene Airpark outstanding. Physical properties of the field are not now very large. But it is the manner in which Eugene, a bustling city of 30,000 in the center of the Pacific Northwest lumber industry, has developed a plan for its small municipal airpark that makes the system a potential model.

Eugene City Ordinance No. 8852 is the key to the plan. This ordinance provides that all commercial operators using the field regularly be required to pay a yearly license fee of $200. Commercial operators are defined as persons using the airpark or airpark facilities for business or commercial purposes, including the following: flight training, charter and sight-seeing flight, sales demonstration, mechanical (*Continued on page 78*)

Flight lines at Eugene Airpark—five commercial operators are now using the field under uniform rental agreements with the municipality. The field is only 15 blocks from the main business section of this city of 30,000 and it's free of approach hazards.

Kingcobra flown by Charles Tucker in the Bendix Trophy Race had streamlined wing-tip tanks and four feet cut off each wing.

Pylon Polishers

THE aerial hot-irons starring in both the Thompson Trophy and the Bendix cross-country races in 1946 at Cleveland were fresh out of uniform—surplus jobs that cost their owners about $1,250 each.

But, they were greatly modified. Armor and armament were ripped out, engines were tuned up to the point of making them prima donnas. Even their paint jobs reflected a civilian outlook. They featured highly-polished and brilliant colors.

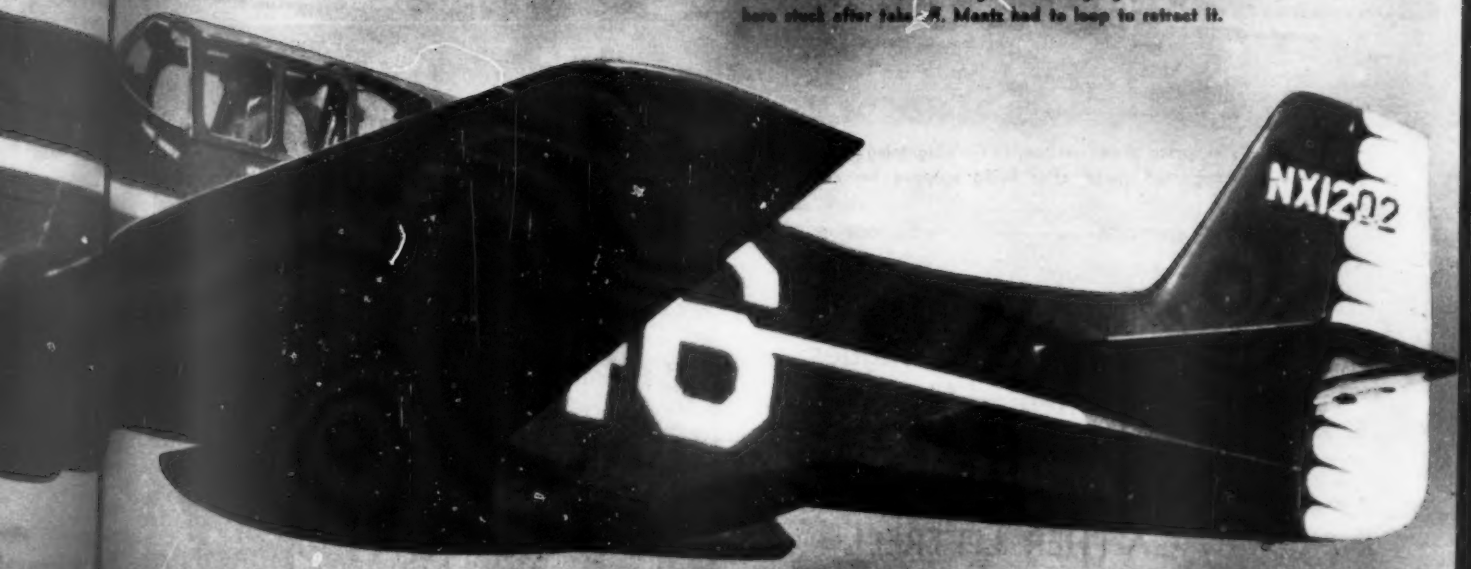
Although there were no official entries from aircraft manufacturers, their technical brains, pilots and airplanes were at the races, working and advising. Typical of the entrants was Lockheed Test Pilot Tony LeVier whose story is on page 50.

Sixteen feet were cropped from the wing of Tucker's second Kingcobra flown in Thompson race. Plane dropped out on third lap with mechanical trouble.

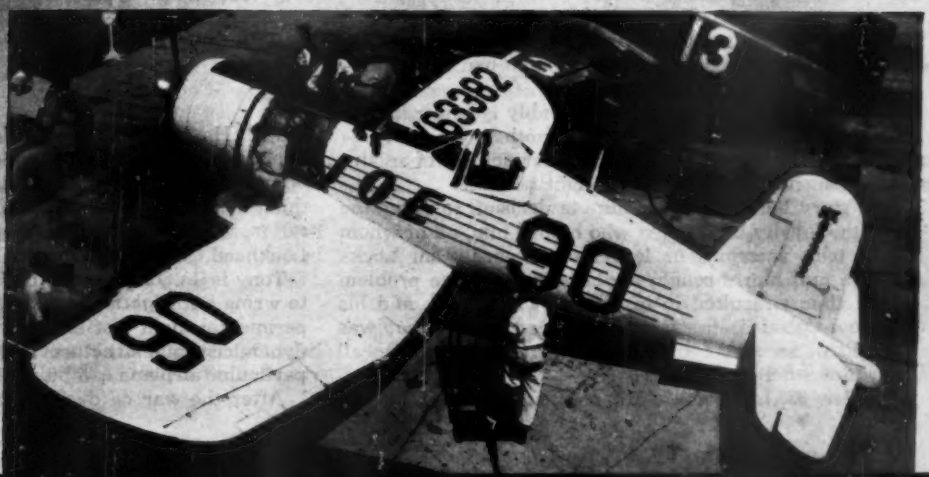
Thompson winner was Tex Johnson whose Airacobra had double normal horsepower, huge propeller.

Invader owned by Caribbean Air Transport was largest aircraft in Bendix cross-country race. Photo shows Don Husted taking off from Van Nuys, Calif., for Cleveland.

Bendix winner Paul Mantz flew Mustang (P-51B) powered with Packard-built Merlin engine. Mustang's gear is shown here stuck after take-off. Mantz had to loop to retract it.



Corsair flown by Thomas Coll was the only former Navy airplane entered in Bendix. This white-painted shipboard fighter had a large belly tank mounted beneath fuselage.



Pylon Polishers

(Continued)

Thompson's surprise plane was Tony LeVier's Lightning (P-38L) which developed unexpected speed after being stripped for acrobatics.

Tony LeVier is a typical pylon polisher. His colleagues at Lockheed helped him place second in the Thompson race.

By GAITHER LITTRELL

West Coast Editor of FLYING

ON THE righthand tail boom of a brilliantly red-painted *Lightning* is this inscription:

THOMPSON TROPHY RACE
SECOND PLACE
(GOOD AS FIRST TO US)
NATIONAL AIR RACES
CLEVELAND '46

This is a surplus plane owned by Tony LeVier, ace Lockheed Aircraft test pilot, who never had any intention of entering the Thompson race!

LeVier is a "pilot's pilot" and probably is better known to the general public today than any other test pilot because of his ability to get more performance out of an airplane than its designer ever thought possible.

The story behind his last-minute decision to enter the race; the loyalty of the men who helped him, all of whom either took vacations or leaves-of-absence from Lockheed to pull him through; an 11th-hour engine problem which almost resulted in his forced withdrawal, and his eventual "good-as-first" second place win in what was thought of as one of the slowest planes in the race, all read like a fiction story.

LeVier, 33, has been a test pilot at Lockheed for 5½ years. He formerly was a pilot for Mid-Continent Airlines and later was with the General Motors research laboratory division as a test pilot. He currently flies everything from *Shooting Star* jet jobs up through the *Constitution*, where he served as co-pilot on the first flight with Lockheed Chief Test Pilot Joe Towle.

Tony LeVier is pictured with Glenn Fulkerson, one of Lockheed experts who drove to Cleveland to lend aid.

Tony is an acrobatic flyer. Since 1941 his job has been to wring out *Lightnings* and *Shooting Stars* under an experimental flight test engineering program to help aerodynamicists and structural experts determine how much a particular airplane can be punished.

After the war he decided to (*Continued on page 70*)

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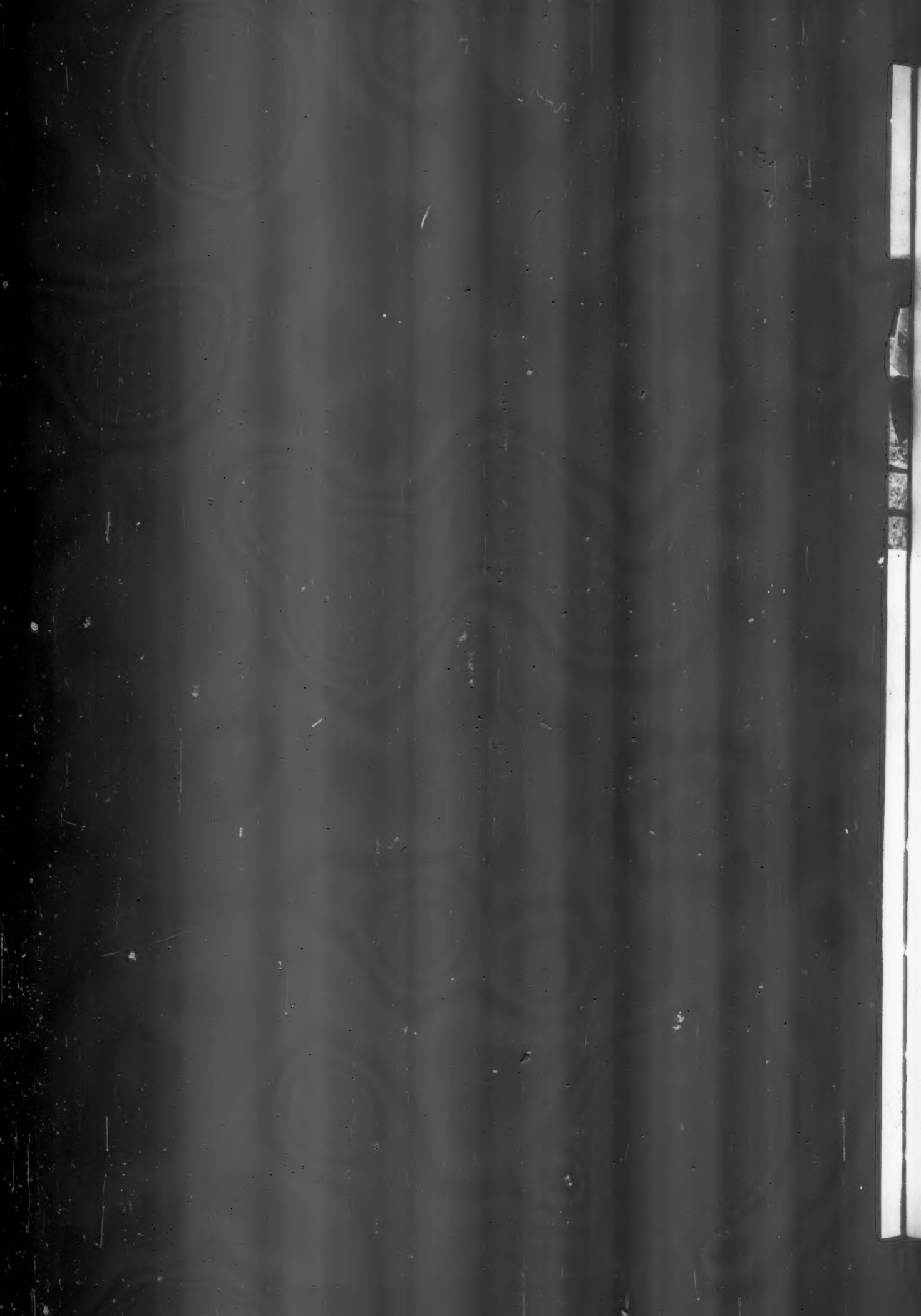


LONDON LETTER

By Maj. OLIVER STEWART

British Authority, Editor of Aeronautics

RECORD breaking, helicopter brevets, gliding and air touring were some of the subjects with which the *Federation Aeronautique Internationale* concerned itself during its London meeting last autumn. The Federation is the sole international authority for making regulations governing comparisons of aircraft performance.

After the appointment of Lord Brabazon of Tara (formerly Colonel Moore-Brabazon and Minister of Aircraft Production) as president of the F.A.I., the conference considered all of the rules governing world speed records.

Unexpectedly F.A.I. received from pilots who have recently set world records (including Group Capt. H. J. Wilson) a report favoring the retention of the present maximum permissible height of 75 meters (245 feet) during the record runs. While Donaldson was doing his record runs on the course on England's south coast this year, there was a popular clamor for raising the height limit on the grounds of safety.

The only major alteration urged in the speed record rules concerned the length of the speed base—the actual timed section. It was proposed that this should be increased from three to six kilometers (3.7 miles) and that the pilots should be required to fly it twice in alternate directions instead of four times.

This was the 39th meeting of the F.A.I. and U.S. representatives were over here for it. French representatives came over in General de Gaulle's Avro *York*. Secretary-General of the F.A.I. is M. Felix Camermann. Treasurer is M. Blondel la Rougery, the publisher. Membership of ex-enemy countries has lapsed. A new member elected was Eire, represented by the Irish Aero Club.

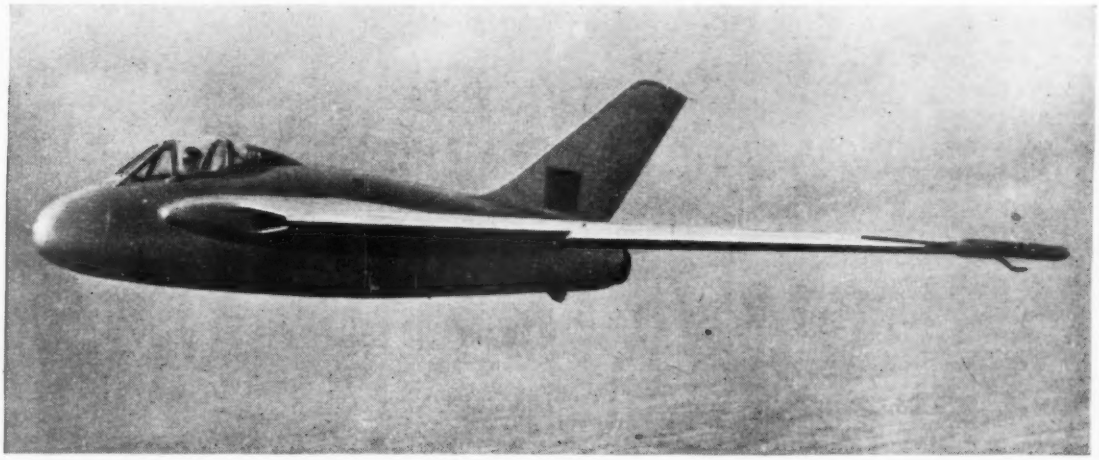
Display

To most of the 5,000-odd guests of the Society of British Aircraft Constructors, the highlight of the Radlett display was the flying of young Geoffrey de Havilland in the de Havilland 108, popularly named the *Swallow*.

Incorrectly called a "tailless" aircraft, the 108 really does have a tail. But with fin and rudder in the vertical plane only, it has no elevator or tailplane.

It was almost the last time Geoffrey was to be seen doing one of his aerobatic displays and the show was one of his best. Only a few days later he met his death in the same plane.

The de Havilland 108 had shown no vices and been singularly good on the controls for an aircraft of fundamentally new pattern. We were all looking forward to seeing it on the speed course at Rustington and it would, without much doubt, have improved on Donaldson's speed of 616 m.p.h.



De Havilland 108 was plane in which Geoffrey de Havilland was killed. Craft has sharp sweepback and a rudder but no elevators.

Reputedly the 108 had achieved a Mach number of 0.88 when flying high. Even if it did not reach this figure when near the ground it could have been counted on on a warmish day for 650 to 660 m.p.h.

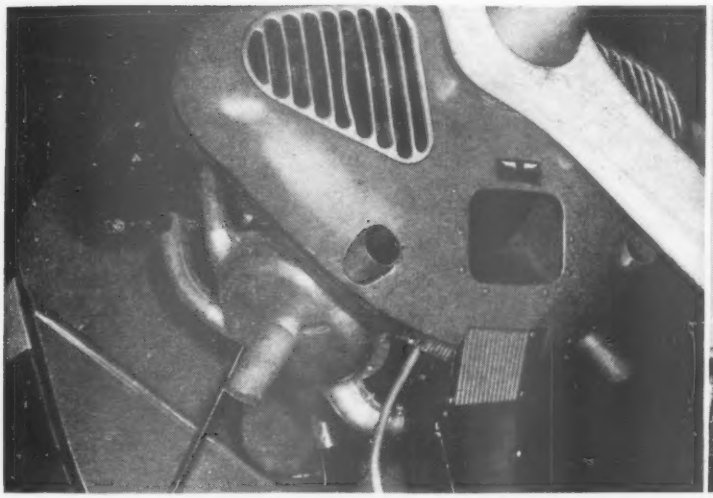
From an examination of parts of the wreckage after the aircraft had crashed in the Thames estuary your correspondent concluded that there was no engine failure. It's *Goblin* turbojet, though battered in the crash, showed no signs of disintegration. There might have been a structural failure when the aircraft was flying in the compressibility region, where the stresses are highly difficult to assess accurately.

Everybody here, (while mourning the loss of Geoffrey de Havilland, perhaps our best all-around pilot) believes that the right course is to go ahead with work on new aircraft of the 108 type. Backswept wings offer great opportunities at high speeds.

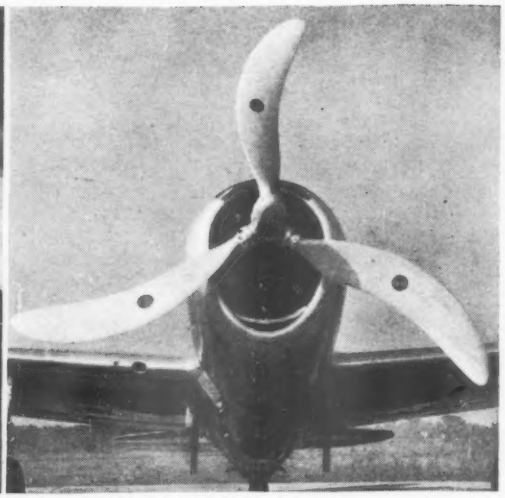
Air Chairs

The old question of whether airline passengers ought to be provided with parachutes has been brought up again. The combined chair upholstery and parachute which has been designed by Leslie Irving for the de Havilland *Dove* make it look as if parachutes (*Continued on page* 93)

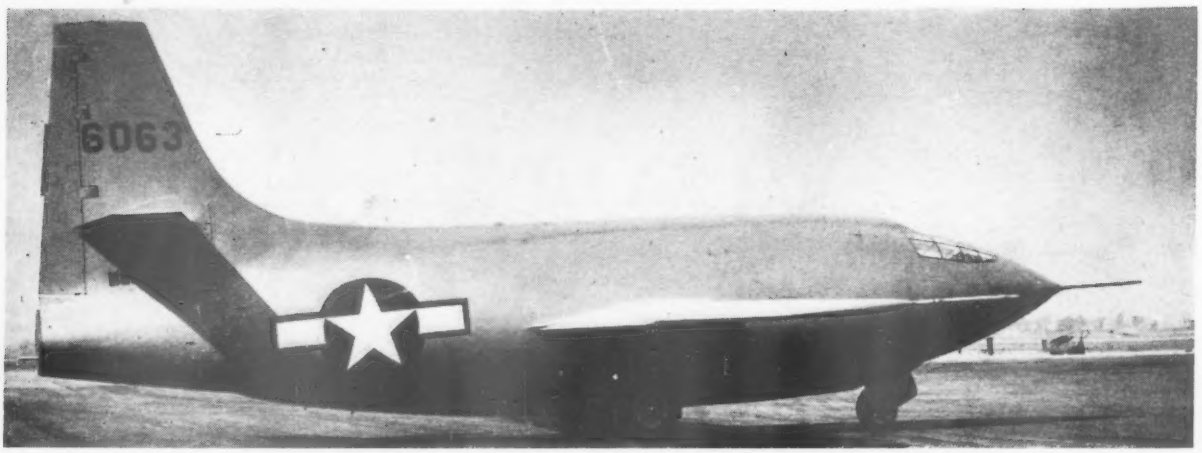
HAVE YOU SEEN?



New Ryan muffler for lightplane engines is stainless steel. It eliminates 90 per cent of engine noise and supplies hot air for carburetor and cabin.



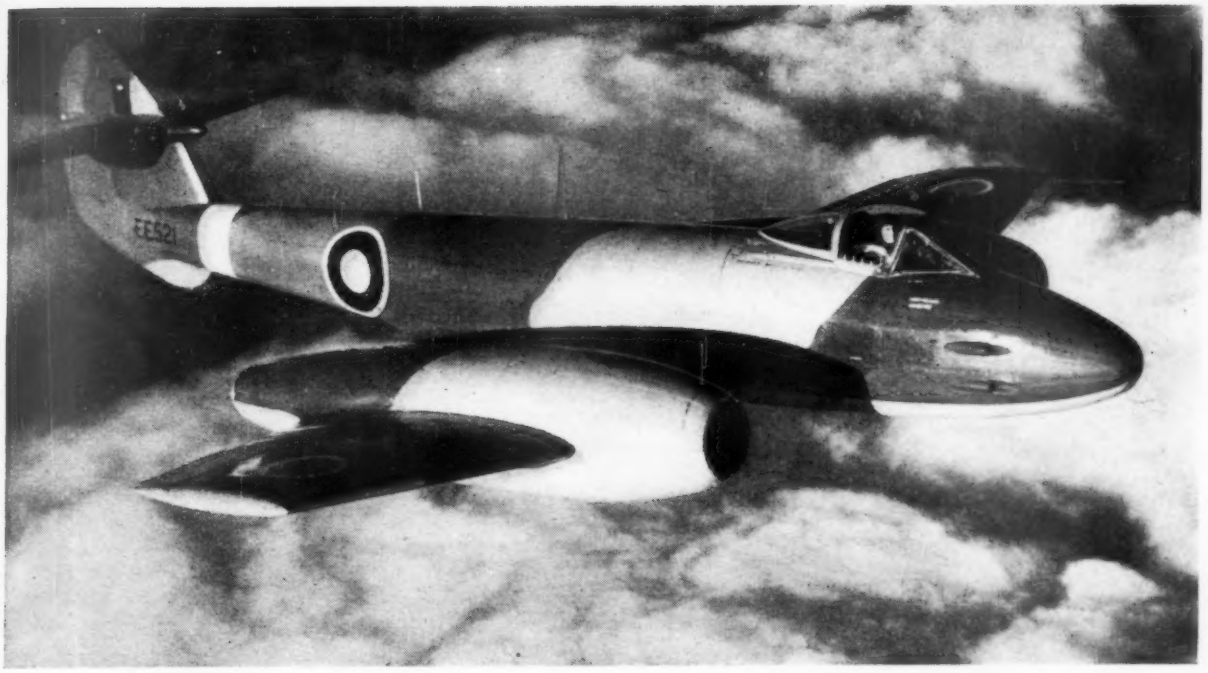
Swept-back blades on Curtiss-Wright propeller are designed for speeds in the 700-m.p.h. range.



Bell XS-1 supersonic, alcohol-oxygen-fueled rocket plane is scheduled to make maiden flight soon. Designed to attain speeds up to 1,700 m.p.h., the XS-1 is basically a flying laboratory. It will gather supersonic data at altitudes of 60- to 80,000 feet.

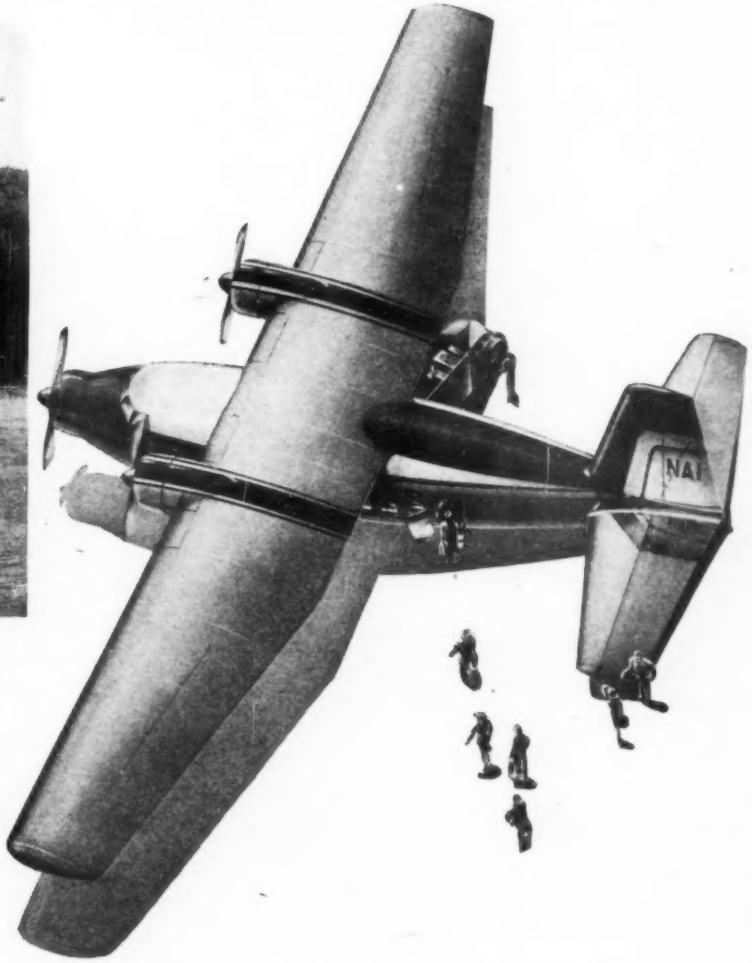
Fairchild XNQ is two-place Navy trainer with 320-h.p. Lycoming engine. It has top speed of 170 m.p.h., climbs at 1,000 f.p.m.

Weatherly-Campbell Colt is four-place plane in $5,000 bracket. It will cruise at 140 m.p.h. on 190-h.p. engine, has 750-mile range.



Clipped-wing Meteor now in production for Royal Air Force has greater maneuverability than former models but performance remains about the same. The plane has two Rolls-Royce Derwent V turbo-jet engines, cruises at 350 m.p.h., has top speed of 585.

First float helicopter to get NC is Bell model. This one will explore Canadian bush country.



Northrop Pioneer is tri-motor design intended to operate out of small fields. It will land with useful load of 10,600 pounds on 750-foot strip, take off in 700 feet, has maximum cruise of 185 m.p.h.

HAVE YOU SEEN?

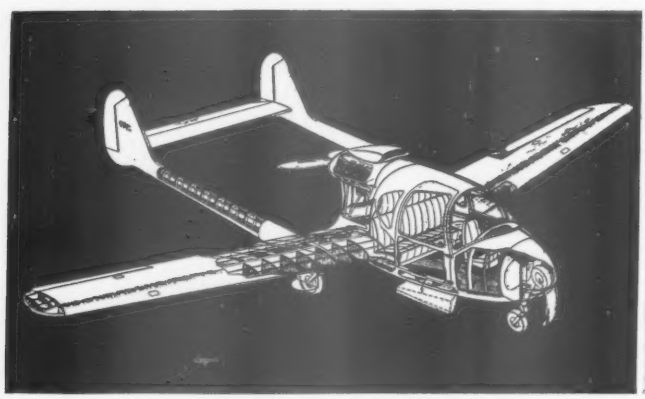
(Continued)

Soviet helicopter has an engine mounted beneath each of its rotors and airplane-like tail surfaces.

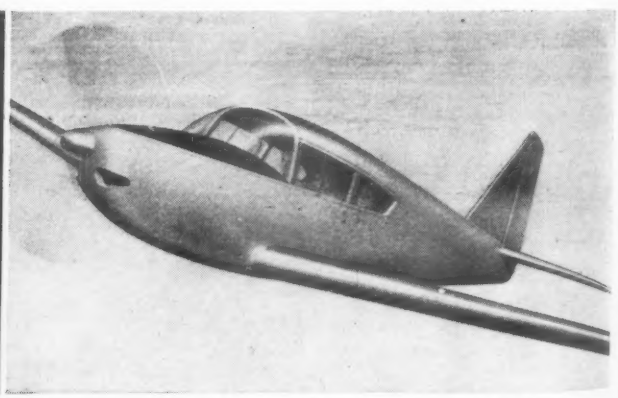
McDonnell helicopter, the XHJD-1, carries 3,000-pound load at 100 m.p.h. cruising. Built for Navy, it has two 450-h.p. Radial engines.

Two-place Spitfire is used for transition training. Rear cockpit is installed high in the fuselage to give instructor clear visibility.

German helicopter has jet-driven rotor blades and small gas engine driving pusher propeller which creates slip-stream over tail surfaces.



Fokker Promoter, deluxe European private plane, carries pilot and three passengers at 121 m.p.h. cruising speed. Engine is 185 h.p.



Proposed Fairchild four-place personal plane may be built in 1947. Interior resembles that of Buick car. Engine may be 185 h.p.

Courlis is four-place pusher in which two additional seats can be installed. Preliminary plans call for construction of 1,500.

THE FRENCH *Airsedan*

Conceived independently, FLYING's 'dream plane' is amazingly like one French engineers are building.

NEARLY a year and a half ago, FLYING's editors published their ideas of what the post-war private pilot wanted in an airplane. Working with aviation engineers and Aviation Artist Jo Kotula, the editors drew up a dream plane which they named the *Airsedan*. An article with pictures of the *Airsedan* was published in the August, 1945, issue of FLYING.

Today a plane so similar that it could be called the *Airsedan's* prototype is not only flying but in actual production. By mid-winter, it is expected that models will be available to private pilots. Within three years, according to carefully worked out production plans, 1,500 of these planes will be manufactured for French family plane enthusiasts and for export.

Where? In France. This French *Airsedan* has been named the *Courlis* and was developed and is being manufactured by the huge Chausson factories. The likeness between the *Courlis* and the *Airsedan* is so remarkable that French editors of *Aero Revue Francaise* have devoted a considerable portion of one of their recent issues to a comparison of the two.

In 1942 the Chausson factories assigned their research organization, the Society of Aero-Naval Studies and Constructions, to do research on a plane designed expressly for the private pilot. They wanted a plane which would fit the average private pilot's needs and skills—the same goals set up for FLYING'S *Airsedan*. Chausson men drew plans and made tests and calculations in secret. The war, of course, delayed construction plans. Both planes then, were designed with the same end in view—building a plane best suited to the private pilot. Considering the amazingly dif- (*Continued on page* 88)

Almost identical in design the *Airsedan*, FLYING's "dream plane" (above), the Courlis (below) were conceived independently. Both are high-winged pusher planes with twin tail booms and tricycle gear. Main difference is conventional controls and 48 more h.p. of the Courlis.

I Learned About Flying From That! NO. 86

Author stands beside the 40-h.p. Cub he wrecked on take-off.

By ROBERT D. FORD

It isn't the forced landing that is difficult, this author found—but the take-off afterwards.

ABOUT a year ago, after obtaining my private license, I decided I knew almost everything about piloting and the logical next step would be to learn all about airplanes. A few weeks later I was the owner of a 10-year-old, 40-h.p. Piper *Cub* which was sadly in need of a recovering job and a major overhaul.

Then the work started. For the next few months my spare time was spent at the airport sanding, doping, grinding valves and doing those million-odd little jobs necessary to get a plane ready to pass the X-ray-eyed CAA inspector. The CAA man appeared, inspected and there stood the little beauty glistening in the sunshine, complete with an airworthiness certificate. It was a happy moment for me.

Now, surely, I felt, life would be undiluted bliss and I blithely flew about the country in my own plane without a worry about paying an operator eight or ten dollars an hour rental fee.

After putting some 40 flying hours on the plane over a period of several months, one Sunday morning I decided that an airshow scheduled for Buchanan Field at Concord, Calif., would not be complete without me. I took off from the Vallejo, Calif., Sky Harbor Airport at 8 a.m. on what ordinarily would have been a routine 15-minute flight. I sailed along happily until, only three miles from my destination, the engine coughed and died.

For some strange reason all the smooth, grassy fields that lie below while the engine is running smoothly seem to disappear the moment it stops. However, I picked the best field available and made an uneventful, if bumpy, forced landing in a rough cow pasture. There was no apparent damage to the plane and, after securing it, I flagged a ride into Buchanan Field where I finally located a mechanic.

We returned to the plane about six that evening and found the cause of the failure. The seat of the carburetor float valve had come unscrewed and jammed the valve.

This was easily repaired and the engine was running perfectly within a few minutes. My problem then was whether to attempt a take-off. Several factors favored an immediate take-off. I could fly home in less than 15 minutes while the only available public transportation would require several hours. To move the plane to a smoother field would require so much time that a take-off could not be made that evening.

Against a take-off were the following: the surface of the field was quite rough; the longest possible runway was only 800 feet long and was bounded by several dry creek beds that criss-crossed the field; the runway headed directly into the setting sun and, although the take-off would be into the wind, the 15 m.p.h. breeze prevailing at the time of the landing had faded to a mere five-m.p.h. whisper. A much smoother and longer field was located only a mile away although two fences would have to be cut and repaired to reach it. A fairly wide highway was a possibility, but it was even farther away.

After weighing the above evidence, one would have thought that even the dumbest dodo would have moved the plane to a smooth field and waited for a good stiff breeze. But not this hot pilot! Hadn't I made hundreds of take-offs from dozens of different airports? Why, I could take off from this little old cow pasture with one hand tied behind me.

I climbed into the plane, cinched up the safety belt a couple of extra inches, revved the engine to its maximum and started off. My plane bounced madly but had almost reached flying speed when I suddenly realized that because of the sun shining directly into my eyes I had deviated from the runway previously selected and was rapidly approaching a dry creek bed. Since there was insufficient room to stop, there being no brakes on the plane, I waited until the last possible moment and prayerfully hauled back on the stick in an attempt to lift the *Cub* into the air.

The plane lifted momentarily—and settled just before the opposite bank of the creek was reached. The wheels caught the bank, tore loose, and my craft dug its nose into the ground and skidded to a stop amidst the crunch of tearing metal and the ripping of fabric with overtones of snapping propeller blades.

I crawled out of the wreckage shaken but unhurt except for an anticipatory ache in my pocketbook and the thought of once again spending all my spare time for months to come sanding, painting.

(*Continued on page* 95)

Airfoam

Super Luxury and Pilot Comfort

Easiest way to secure luxurious comfort in small personal planes—surest way to banish pilot fatigue and cramp on long hops — is to install deep-cushioned AIRFOAM seats. This Goodyear wonder cushioning is being used in both seats and mattresses on the newest super-airliners like the Douglas DC-6 because it provides luxurious restfulness, longer cushion life, and reduced weight when seating is designed to use it. AIRFOAM never sags down or lumps up. Millions of foam-like air cells give it a permanent buoyancy that absorbs vibration and rough-weather bounce. Ask your airport supply dealer about AIRFOAM, or write: Goodyear, Aviation Products Division, Akron 16, Ohio or Los Angeles 54, California.

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AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is: "To make flying more useful, less expensive, safer and more fun." Headquarters are: 1319 F Street N.W., Washington 4, D. C. Mmbers also receive a special "AOPA" edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

FREE OUR PUBLIC AIRPORTS

AOPA recently requested that no landing fees be charged on airports built with money obtained through the Federal Airport Aid Act. Since public funds are being expended the public should have free use of the proposed fields, AOPA contends. And while one section of the related Public Law requires that airports developed under this program be operated as public enterprises, there should be no cry of "discrimination" if personal aircraft owners are given protection of a no-landing-fee provision. Actually such a charge for the use of public property, assessed against those who do not operate for profit, will prove harmful to aviation.

Assessment of landing fees would seem to be a device with which commercial operators can drive private flyers away from a given port. Budgets for commercial operations can easily provide for such expenditures; those of private pilots cannot.

The new law providing Federal aid for airports involves a program which the AOPA described as "the people's formula." AOPA asks that this interpretation be strictly observed—that these public funds be used to develop the many small airports we need instead of a few gold-plated ones, and that private pilots be exempted from "the bite" whenever possible.

GCA TRIAL READIED

Real progress has been made toward the adoption of Ground Control Approach radar in landing systems—a safety step long urged by AOPA. GCA will be tried at the nation's three busiest airports: Washington National, Chicago Municipal and New York LaGuardia, this winter.

The association is gratified that the CAA has taken this action. It will not only mean much to the personal aircraft flyer but will comprise a positive safety addition for the airlines, which now are dangerously near safety limits under present bad weather "stacking."

GCA, in the association's opinion, is the immediate and probably the long-range answer to a landing-approach system which fulfills the difficult requirements of safety; adaptability to personal, transport or military aircraft; large landing capacity per hour; no special instruments (except two-way radio) or training needed; and useful for immediate airport operation.

A brilliant adaptation of war-time radar used to shoot enemy warplanes out of the air, GCA consists of two cathode ray "scopes." One shows the entire area including aircraft, buildings, etc. for a radius of 30 miles around the airport.

The second shows the aircraft on its landing approach, in three dimensions, so that the GCA operator guides the pilot via radio as to course, distance from the runway and rate and angle of descent. AOPA views GCA as the long awaited answer to normal airport operations during low visibility and hazardous weather.

MORE FARMERS USING PLANES

A surprising recent development in personal aviation has been the large number of farmers purchasing and using lightplanes. Possibly the greatest single class of new AOPA members has been farmers. Several flying farmer groups are being formed.

In the words of one AOPA farmer-pilot, "All the farmer needs is a small T-shaped hangar and a landing strip running with the prevailing wind. Too, farm boys and girls make exceptionally good flyers since they have spent much of their lives handling farm machines."

Many farmers are finding valuable uses for light aircraft: for commuting to city areas; for quickly obtaining needed repair parts for farm machinery; and even to assist in ground utilization for crops.

SAFE PILOTS NEEDED

AOPA's crusade for safer flying has become increasingly important with the upsurge in lightplane sales and the association strongly supports and advocates efforts by its members along this line. The following reminder was prepared by the San Francisco-Peninsula Chapter of AOPA:

ARE YOU GUILTY?

LOW and LOUD flying is arousing Peninsula residents to urge MORE restrictions on private flyers.

More restrictions mean less fun, fewer airports, instead of more fun and more airports.

Airport operators cannot prosper and won't invest in a business with a doubtful future. More restrictions mean just that—a doubtful future.

With a public antagonistic to any further extension of private flying facilities, each and every plane owner and pilot will suffer.

Let's not have our flying pleasure ruined by *DAMN FOOL flyers!

If you are guilty, get on the bandwagon. Be a SALESMAN for aviation, not an ANCHOR on it!

*DAMN FOOL—meaning one who unnecessarily goes out of his way to be obnoxious.

AOPA AIDING FLYER

I become more loyal to you with each issue of your various publications. The remark made in October's AOPA Edition of FLYING by someone that a "conference is a group of individuals, who as individuals, can do nothing but who met to decide that nothing can be done collectively," certainly does not apply to the AOPA group.

We, as individuals, do a lot of impotent hollering, but are a lazy lot. AOPA seems to be thoroughly familiar with all our problems and sets about pitching hard and sincerely in our interests. (Wish Congress would do the same.)

RITA A. DIXON
AOPA No. 11722
New York

END

Winner of the Piper Safety Award in Pampa, Tex., Mrs. Ruth K. Jesse (AOPA 20694), receives contest trophy from instructor J. M. Sims (AOPA 21786), at Pampa Airport.

Socony-Vacuum's Famous
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The Navion

(*Continued from page 41*)

it wouldn't be fair to criticize such things as air leaks around the doors and miscellaneous rattles. Despite such minor annoyances, this particular *Navion*—NC-91118—was a dream to fly.

There are several *Navion* features different enough to attract special attention. There are no foot brakes. The two main wheels are braked simultaneously by a large pistol-grip hand brake that sticks out under the dash between pilot and copilot. Another handle, right beside the brake, operates the emergency gear and flap pump. The plane is steered on the ground with the rudder pedals, which turn the nose wheel.

Another *Navion* departure is the method of getting into the cabin. Unlike any other airplane I have seen, the *Navion* must be entered by stepping on a fixed step hanging down just behind the engine, up onto the leading edge of the right wing, then back into the cabin. Women in particular will find this awkward, for the steps one must take are quite long and high.

But the *Navion's* present means of entrance is not only awkward; it might tend to be dangerous. Under no circumstances can one get into this airplane while the engine is running without violating the basic, beware-of-the-nose safety precaution. Another point on the questionable side: I wonder how many miles an hour are lost because of the nose wheel, passenger step and large aileron hinges, all sticking out of the slipstream?

Like nearly all tricycle-geared airplanes, the *Navion* is almost too easy to handle on the ground. You can taxi at 10 or 50 m.p.h. with equal ease. Visibility is excellent. The pedal-steered nose wheel operates easily. If I were trying to improve this particular feature I might consider making the nose wheel steerable through the steering wheel, rather than the pedals—although the present system is quite satisfactory once you become accustomed to it.

When I flew this particular *Navion*, our gross weight was 2,329 pounds—241 pounds under maximum. The gas tanks were full (39½ gallons). The air temperature was 54°, altimeter setting 3038, and the wind was North 12 m.p.h.

I made several take-offs with that load, each of them in exactly 10 seconds, without flaps. To take off, the *Navion* is simply steered down the runway with the nose wheel. When the airspeed needle passes 55, you just ease back on the control wheel and the plane takes off. As soon as you are airborne, you retract the landing gear by pulling up on a white-knobbed handle on the dash, just under the air-speed indicator. There are red and green lights to indicate position of the gear, and the usual horn that blows if you cut the throttle with the gear up.

I found the best climb to be at 90 m.p.h. indicated. At that speed I was able to get a rate of climb of 880 f.p.m. between 2,200 and 3,200 feet above sea level. North American claims 830 f.p.m. with the plane carrying a full load at sea level.

In level flight, the throttle is adjusted only slightly. Normal cruising is at 2,150 r.p.m. and this speed is maintained by adjusting the Hartzell controllable propeller with a small button to the right of the throttle handle. The Continental engine delivers its maximum 185 h.p. at 2,300 r.p.m., which makes a difference between cruise and maximum speeds of only 100 r.p.m.

To check cruising speed, I flew this airplane on a round-trip cross-wind course between Chicago and Peoria. One leg was 126 miles long, the other was 117. One leg was flown at 3,900 feet above sea level, the other at 2,500. Indicated air speed was held at 145 m.p.h. and 2,200 r.p.m. were used. My average ground speed for the round trip was almost exactly 145 m.p.h.

NORTH AMERICAN NAVION

Approved Type Certificate No. 782

Engine	185-h.p. Continental
Wing span	33 ft., 4 9/16 in.
Length	27 ft., 5 13/16 in.
Height	8 ft., 9 in.
Gross weight	2,570 pounds
Empty weight	1,551 pounds
Maximum speed	160 m.p.h.
Cruising speed (5,000 ft. @ 70% h.p.)	150 m.p.h.
Most economical speed (5,000 ft. @ 51% h.p.)	115 m.p.h.
Landing speed with flaps	54 m.p.h.
Maximum range	700 miles
Service ceiling	15,600 feet
Rate of climb (sea level)	830 f.p.m.

Source: North American Aviation, Inc.

Flying the *Navion* at slow speeds gave me as much of a thrill as did any other performance characteristic. This is an airplane that has been engineered with great sympathy for the bone-headed mistakes made by the best of us. While it cruises like a lion, it stalls like a lamb. I stalled it wheels and flaps up, and wheels and flaps down. The former naturally came at a little higher airspeed (about 58 m.p.h.) but not much. The latter came at 55 m.p.h. With gear and flaps down, and using 1,600 r.p.m., I was able to maintain altitude at between 58 and 60 m.p.h. indicated. The *Navion* in a full stall reflects North American engineering at its best. As the airspeed reaches 55 m.p.h., a gentle shudder begins in the tail. The airplane can be held in that position indefinitely, with the tail buffeting moderately and the plane mushing toward the ground. All this time there is excellent aileron control; I made a number of 180° and 360° nose-high turns under those conditions. Though I did not try to spin the *Navion* myself, it's obvious that it would be quite a job doing so. I'm told the airplane can be spun if the rear of the cabin is loaded down, but that it is quite a job even then.

Landing the *Navion* can be more fun than a whole hour of aerobatics. With flaps and gear down, and holding an air speed of 75 m.p.h., you can make a nice steep approach until you're just above the runway, then flare back and squat the plane on its back wheels, nose wheel held high. As soon as the rear wheels hit, the nose wheel eases onto the ground, and you can pull on full brakes right then and there.

But if you really want an experience, fly into the airport pattern at about 2,000 feet and go right on around at that altitude until you're on final approach. Then drop full flaps, stick the nose down, and hold 90 m.p.h. indicated. The angle at which you then are diving into the field (you never go over 90, no matter how it actually looks) is enough to make your hair curl. At that angle you can be almost over the edge of the airport, yet you'll still get in nicely, slowly, and with complete safety. As a matter of fact, I found myself undershooting the runway a couple of times.

Now that I have tried the *Navion* for myself, I'm looking forward anxiously to my first long cross-country trip in one. The cabin is the size of a four-door sedan, you can sit back and relax in any one of the four seats, there's plenty of leg room, and the noise level has been held down quite well. The baggage compartment behind the rear seat is so big you'd almost forgive North American any shortcomings because of it. The fighter-type sliding hatch is excellent, except that it needs some sort of safety lock to keep it from slamming forward accidentally in case you stopped suddenly while taxiing. There is a safety lock on the *Navion* now, but it permits the hatch to slam too far forward; you'd get quite a bang on an arm or head if either happened to be sticking outside the cabin at the wrong time.

The engine is started by pressing a button with the foot, ahead of the right rudder pedal. Flaps and gear are operated by up-and-down knobs, each of different size and shape, on the instrument panel to the left of the throttle. The elevator trim tab is operated by a ridged wheel in the instrument panel, right beside the throttle. In some *Navions* there's also an automobile-type rear-view mirror on the windshield center post; visibility to the rear is excellent because of the large transparent panels in the hatch.

The hatch, incidentally, is easily removed. So are all seats but that for the pilot. The *Navion* thus can quickly be converted to a light freighter, and will haul nearly 700 pounds of cargo—a feature that should fascinate small-airport operators, non-scheduled air carriers, farmers and ranchers.

The *Navion* now has its Approved Type Certificate and is in production; nearly all distributors now have their demonstrators. Earlier in the year, North American sent a *Navion* around the country for press demonstrations. FLYING, however, did not publish a Check Pilot article on it at that time because the airplane still carried an NX.

This excellent airplane will go a long way toward selling many non-flyers on the utility, speed and economy of small-plane flying. And any present-day flyer who could use an airplane in the $6,000-$7,000-class, and wants one that will fly as slowly as a lightplane and almost as fast as an airliner, had better look up a North American *Navion* demonstrator first thing in the morning. MAX KARANT

No Other Two-Way Radio So Amazingly Easy to Operate!

New Airadio "Super 52" Operates Entirely from Instrument Panel! Convenient as Your Throttle! Automatic Volume Control Prevents Overloading!

No more reaching, stretching, turning to work the radio in your plane! Everything about Airadio "Super 52" is designed for your quick convenience in flying.

A flick of the switch takes you from your favorite dance band to the radio range . . . highway of the air! A twist of the dial puts you in immediate touch with the control tower! Another flick—and you're speaking on the interphone to your passengers.

But convenience is just one reason why the Airadio "Super 52" is your best buy. The Airadio two-way system offers you such other superior features as these:

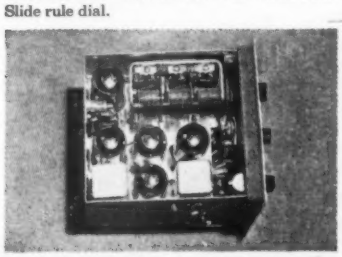
- *Built-in range filter that insures clear reception of voice signals over range tone signals.*
- *Automatic volume control that prevents overloading and distortion when flying toward transmitting station—as well as fading of signal when flying from station.*
- *Manual volume control for special use when flying the radio range, so pilot can judge distance by signal strength.*

Install the Airadio "Super 52" in your plane—NOW.

Write today for particulars about "THE WORLD'S MOST MODERN AIRCRAFT RADIO"

POSTCARD SIZE FOR HANDY INSTALLATION. Fits any average instrument panel. Total weight (receiver, transmitter, power supply) 10 lbs. 10 ozs.

SIMPLIFIED DESIGN FOR RAPID TUNING Just three knobs and switch for band selection. Slide rule dial.



CLEAN-CUT INTERIOR DESIGN FOR MAXIMUM EFFICIENCY. Full-size tubes can be replaced anywhere.

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Lightplanes for Businessmen

(*Continued from page* 33)

regular sales trip he covers 1,200 miles through West Virginia, Virginia, Kentucky and southern Ohio. By car this takes seven days. By plane it takes five, knocking off two days' hotel bills and meals. He gets nine miles per gallon in his big car, 20 miles per gallon on his plane. Storage in the garage or hangar is the same, but at the airport he doesn't have to tip the attendants.

Nelson reckons he cuts about $66 off his usual $200 travel expense and saves 20 per cent of actual travel time while spending the same amount of time with his dealers.

Out west, where wide open spaces aren't just a gag, lightplanes have turned into a virtual must in many business ventures. Milo V. German manufactures farm and irrigation equipment at his plant in Cozad, Neb. Flying a *Luscombe*, he was able to cover 34 states in the past six months on sales trips. German built his own flight strip near his plant. One employee flies a *Cub* 22 miles to and from work every day.

Truck-fleet owner William H. Lee has his home office in Chicago, but his operations are spread throughout the U. S.—a network which Lee tries to oversee personally. At the present there is considerable work in Texas making it necessary for him to be in Fort Worth and El Paso every other week. Although a fighter pilot during the first World War, Lee had not considered using a plane for business until June, 1946, when he purchased a Cessna 140.

Now, at a cost of approximately 3.5 cents per mile, he flies to Texas twice a month and does other business flying averaging 120 hours a month. Cost isn't important to Lee but time is, and with a personal plane he cuts days from his travel schedule. For example his work in Fort Worth generally keeps him busy until about 2 p.m.—after all regular airlines and trains have departed for El Paso. He hops into his plane, flys to El Paso and arrives there about dusk. He finishes up his work there by early evening and flies back to Fort Worth the next day. He arrives in Fort Worth about 10 a.m.—the same time he would have arrived in El Paso if he had waited for a train.

Lee said that his Fort Worth superintendent recently bought a Globe *Swift* and has cut his monthly expense account by 35 per cent by using the plane. Lee recently bought a Bellanca *Cruisair*.

In Cody, Wyo., Larry Siddle is planning a ferry service for a group of cowpunchers who want to compete in rodeos. Since all big rodeos are scheduled consecutively, a bronc rider may finish a show in Cheyenne one day and have to be in Reno the next morning. Using a twin-engined Cessna, Siddle plans to pick up his passengers right after one show is over and deliver them to the next with plenty of time to spare.

C. W. Maynard, a Trans-World Airline captain with thousands of hours in the air, now is flying TWA planes from Washington to Paris, Rome, Geneva and Cairo. A couple of hours before he's scheduled to take off from Washington, he hops into his own Aeronca at his home in Putman, Conn., flies down to Washington, parks the plane, makes his two-week trip to Europe, returns to Washington, hops back in his plane and is home for dinner a day earlier than if he relied on commercial transportation facilities.

Perhaps not typical of the businessman pilot is Earl F. Ronneberg, a Chicago industrial designer, who has "never taken a pleasure hop in my life." To him his Piper *Super Cruiser* is just something that will carry him 5,000 miles per month at 100 m.p.h. If it is more convenient to get to a job by car, he drives, but if flying will save time, the car is parked at the airport and the plane goes to work.

Ronneberg became interested in planes during the war when he was having trouble getting reservations on commercial transportation lines. He went to an airport, learned to fly and rented planes until the *Super Cruiser* could be delivered. He estimates his flying costs about five cents per mile.

How fast the number of businessmen-pilots will grow depends on two factors, the experts agree. First comes the speed of turning out new airplanes, and second, the progress of the airport expansion program.

Right now, many new airplanes are harder to get than a 1946 convertible. A tremendous backlog of orders has piled up and many potential pilots are delaying flying careers until delivery of a plane.

In the first month of peacetime plane production, four manufacturers alone had 40 per cent more orders on hand than the number of planes turned out in the three-year period 1939 to 1941, according to a *Time* magazine survey.

As far as production goes, the airplane stands today where the automobile did in 1900. Today there are approximately 40,000 certified planes. CAA expects an increase to 400,000 planes in the next 10 years. Of this number, CAA expects 40,000 to be used by business concerns; 280,000 will be a combination of personal, business and recreation; and the remainder will be commercial aircraft.

With national airports and many smaller airfields doing a capacity business, CAA looks to the national airport expansion program under the Federal Airport Act to ease the situation with 3,000 new airports.

Then there's another factor in the picture. Today, a great many more persons can fly than before the war. Thousands of military pilots have already taken out commercial licenses. There are approximately 7,000 airline pilots, 200,000 commercial pilots and 150,000 private flyers.

Here's one example of the way the influx of military ex-service pilots applies to the business picture:

An enterprising insurance executive in St. Louis, L. R. Felker, saw a fine chance to do an expanded, specialized job selling aviation insurance. Figuring aviation insurance would grow as fast as the industry itself, Felker hired five former Army and Navy pilots as flying salesmen to cover surrounding states. Right now his men use rented planes but they are awaiting delivery of new company planes.

AOPA expects business trip air mileage to do big things in aviation expansion. In addition to the great increase in number of hours flown yearly by personal aircraft, it will increase the average operating radius of small planes, lead to greater cross-country coverage, level out private flying "peaks," and cut down seasonal variation.

With businessmen adding their voices, there'll be a louder demand for better airport service, airports closer to centers of towns, elimination of unnecessary state and aeronautical Federal red tape, clean-up of regulations, and safer, more utilitarian planes. They will help private flying come of age. END

15 YEARS AGO

FROM the January, 1932, issue of this magazine:

First of 135 fighters ordered by the Army Air Corps had been delivered by Boeing Aircraft Co.. Powered with a supercharged Pratt & Whitney *Wasp* engine the new planes had an upper wing span of 30 feet and was only 20 feet long.

Jimmy Doolittle clocked up another record when he flew from Ottawa, Canada, to Mexico City in 13 hr. 36 min. He used a small biplane with a very short, compact fuselage.

The Sperry Gyroscopic pilot was successfully demonstrated on an 18-passenger plane at the Newark, N. J., airport. The mechanism, weighing about 100 pounds, took full control in the air and guided the test plane faultlessly.

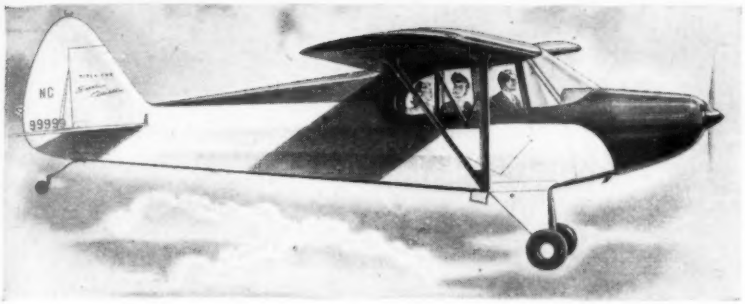
An English amphibian, the Saro *Windhover*, had a novel wing arrangement. The main large wing was attached in the usual manner. But another smaller wing was placed above the three engines to give the plane "additional lift and increased stability."

The nine-passenger *Pilgrim* transport eliminated wheel chocks in favor of a parking brake that locked the plane and enabled the pilot to warm up the motor without getting under way.

Latest British military development was the single-seater fighter known as the Bristol *Bulldog*. It was powered with a 480-h.p., nine-cylinder, Bristol *Jupiter* engine. Propeller blades were nearly parallel to the shaft at the roots and as with most British planes, the *Bulldog* had a pronounced dihedral angle.

Junker's new stratosphere plane, the JU-49, was successfully tested by Herr Hoppe, its designer. The plane showed unusual ability for attaining extremely high altitudes. It had an airtight, insulated cabin equipped with oxygen apparatus.

The Kohl flying wing had given a good account of itself in trial flights. It had a pusher-type, two-cylinder, 30-h.p. engine. Cabin, located in the center of the wing, afforded perfect vision.



THE 1947
PIPER CUB SUPER CRUISER
FOR 3 PEOPLE

PIPER
brings you a
TWO-WAY RADIO
and an
ELECTRIC STARTER
as standard equipment

TWO-WAY, TWO-BAND RADIO. Combines transmitter and receiver. Both airways and regular broadcast reception. Instrument panel controls.

ELECTRIC STARTER. Just press the convenient button on the instrument panel to start the Super Cruiser. It's as safe and easy as starting your car!

"IT has everything!" . . . that describes the three-passenger Piper Cub Super Cruiser. Although it is moderately priced, the Super Cruiser includes a two-way, two-band radio and an electric starter as *standard equipment!* Now you can fly cross-country by radio beam, talk with airport control towers, enjoy favorite programs in flight. The electric starter eliminates hand-cranking the propeller. You simply press a button on the instrument panel. It's safer . . . more convenient!

A full hundred-horsepower engine, quieted by a muffler, gives the Super Cruiser a top speed of 115 miles per hour. And you can travel more than 600 miles at a hop, thanks to the 38-gallon gas capacity! All this in a *three*-passenger plane—for the price of many two-passenger ships.

Have your Piper Cub Dealer give you a free flight demonstration now. See him, too, for the full-color Piper Cub literature and the popular books . . . *How to Fly a Piper Cub* and *What Your Town Needs for the Coming Air Age*. Remember—only Piper makes the Cub, that good, safe plane. Piper Aircraft Corporation, Lock Haven, Pennsylvania, U.S.A. . . . In Canada: Cub Aircraft Ltd., Hamilton, Ontario.

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LOOK TO THE LEADER FOR GOOD SAFE PLANES
YOU CAN AFFORD TO BUY AND FLY

PIPER

Learn to Fly from the Insect

(*Continued from page 35*)

was the best approach, but maybe the worst, so one *could make the most mistakes earliest, and find out the most things not to do.*

In this bug experiment, by the way, outside of my own time, I have spent about $20 in apparatus and equipment during the past three years.

The rest was a little gray matter, paper, drill rod, an old vacuum cleaner, sticks, bamboo, glue, and a helluva lot of patience, which is the thing that makes the experiment stick, even more than the glue.

And now back to our experiment!

In all insects' wings there is one fundamental, and that is a stiff leading edge spar getting more and more flexible from the root to the tip, behind which is a flexible membrane. As the spar flaps up and down with some kind of motion, simple, harmonic, or otherwise, the trailing membrane takes various shapes and thrusts the air backward.

At least that seems obvious when I study an insect's wing.

And so the first apparatus built was just a curved leading edge spar (Figure 1) tapering from the hinge at H out to the tip, where it was curved around toward the rear. A sheet of tissue paper was then glued to the spar in tension so that the springing of the spar kept it tight.

Next was the problem of how to flap the wing. To have it stand still and flap would merely make a fan out of it, giving no indication of lift. I had no apparatus to measure the small amounts of power and thrust that would be had, nor any intention of spending that amount of cash on so obvious an experiment; so ingenuity had to take the place of cash.

I dragged out an old music stand and set it up in the shop. Extending the top bar, I sharpened the end of the rod to a point, dropped a tube over the end of the rod with a piece of glass in the bottom of the tube so that I had a pinpoint pivot bearing. To this I fastened an arm five feet long. At the one end was a small electric motor of about 10 mouse power, or thereabouts. The weight of this balanced a cross arm around the pivot, and on the other end I put a wooden pulley with a string belt connecting the motor down at the other end of the apparatus, so the motor could turn this wheel on about 8:1 reduction.

On this wheel was a crank and a connecting rod. Suitable electric connections were made through commutators to carry the electricity into the motor. When this ran, the pulley, rotating, flexed the wing up and down through a predetermined arc as shown.

This apparatus was the first *"Geflopigator"* built purely to get some qualitative results to see whether I was really working at anything—which I was not sure of at the start.

To my great surprise, this whirling arm actually took life under the thrust of the primitive wing and circled around its pivot at some 20 m.p.h. even with all the drag and resistance built into the crude apparatus. Everything on it was made by hand, even the pulleys cut out with a fret saw, and the grooves made with a V file. The bearings were wood, the pivots were nails. But it indicated enough possibilities so that I felt more study was warranted.

The past few months have been full of rather rabid experimental work and study, as I normally follow other more definite and lucrative activities. But I believe the results justify some enthusiasm toward a line of study in research among youngsters, students and model airplane groups who do not think of themselves as too intelligent to take up such a simple problem.

We are claiming no results—only the beginnings of a new interest in the oldest and most efficient flight method of all.

Man has tried to evade nature's method of flying and do it his own way, even with the rotating wing approach.

The wheel is an ideal invention for the ground and is one of the few things man has invented which nature did not bring into being because it had never found a way to do a good grease job. It can oil a ball and socket, or a hinge, but I don't know how nature would oil the hub of a wheel or repair a ball bearing if it got rheumatism.

When it comes to the air, however, the wheel has no place.

We put a propeller on the airplane simply because it was the only way the Wright Brothers knew to get thrust—and no one else has bothered to change since. We have great difficulty in getting the center of thrust where it should be. We have to stick engines or nacelles and nose spinners out on the wings in places where they create drag. Nature has just the body and the wing; we had to put a whole lot of bumps all over the place to slow down on progress.

Also, the weight of the propeller and the hub and the adjustment mechanism and the controls was all parasitic. We already had in the wings themselves ready-built strength for the area and structure necessary for thrust. As a matter of fact, we use it now for thrust when we shut off our power to glide into a field and give the wing a small angle of attack.

In another case we have tried to use the wheel for direct lift—the rotating wing—the "hell-a-co-peter," as Mr. Sikorsky calls it, and found that we could get direct lift in this way, and by adding a lot of trick mechanism could even get bad forward flight.

Of course, the helicopter wing is doing 300 m.p.h. when it's standing still, and the proper shape of its blade is not far off from our flapping wing of Figure 1, except that the structural principle is different.

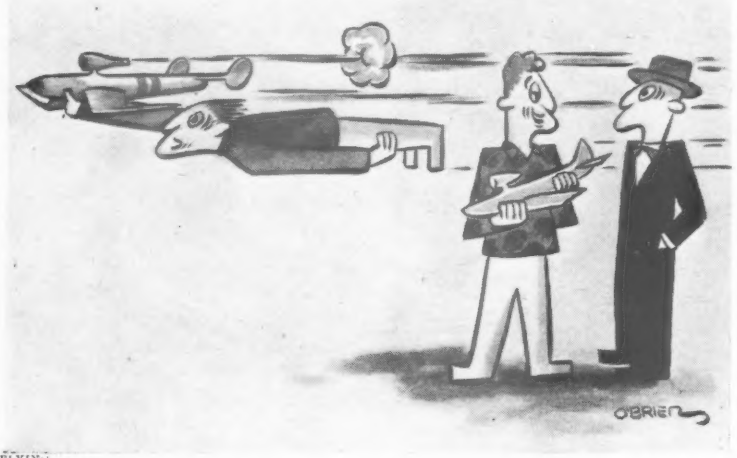
But whether we like it or not, the helicopter rotating wing is a flapping wing moving in a circle.

It has to be hinged.

When the helicopter is flying forward, the blade on one side is going against the air at 400 m.p.h., while the same blade on the other side of the same rotation has only 200 m.p.h. attack speed. As we have the same angle of attack on both sides of rotation, we have too much lift on the approaching side and too little on the receding side, so we have to change the pitch, reducing the angle of attack on the side approaching the air and increasing the angle of attack on the side going backwards. Even then, the blade on the one side climbs and on the other side drops, so that all blades flap up and down as they rotate in their circle.

In our flapping wing airplane we will have to do the same thing, having a greater angle of attack on the down stroke and a lesser one on the up stroke, variable with the speed of the wing through the air so that between the flapping and the speed of forward progress you will get constant lift at all times and no bobbing up and down.

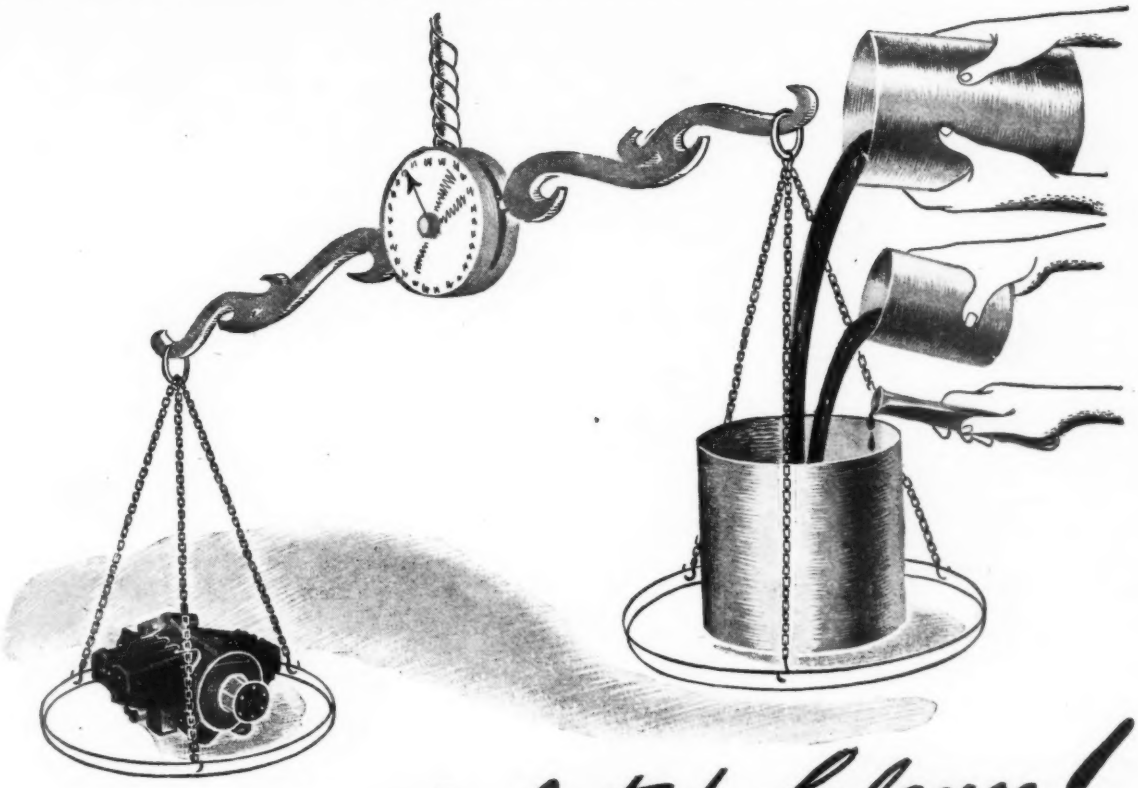
But to get back to our experimental



FLYING

"You have to be careful when you start these jet models!"

AEROSHELL LUBRICATING OIL...



... a calculated balance!

OURS would be a simple job if your plane engine needed just one kind of lubrication. . . .

The point is, the *same* engine oil must lubricate and cool surfaces under a wide range of bearing pressure and temperature conditions . . . must do its job without penalizing any vital part.

That's why a quality oil like AeroShell is a "calculated balance" between engine requirements and oil characteristics—why Shell employs solvent-extraction refining and scientific blending to produce an oil that gives superior service in the performance of its many-sided task.

Let the Shell sign be your guide to top-quality lubricants and fuels . . . to careful, efficient service . . . to greater enjoyment of travel by air.

SHELL

FINER FUELS FOR THE AGE OF FLIGHT

SHELL AVIATION FUELS • AEROSHELL LUBRICATING OILS AND GREASES • SHELL HYDRAULIC FLUIDS

apparatus which was shown in Figure 2.

The reason for the whirling arm type of experimental stand was so that forward speed could be had along with the thrust to get the combined effect of thrust and lift as encountered in actual flight.

With our limited facilities we had no wind tunnel and chose the rotating arm type. For direct lift, this is turned with the pivot axis horizontal. There were a lot of faults in this first apparatus, however.

A few quantitative tests were made on various types of wings but the power of the motor was very small and the string belt idea not too hot. The wing flapped through intermittent loads on the belt so that it slipped on the down stroke and caught up on the up stroke. Even with a spring device to keep the belt load constant the readings could not be correctly evaluated. It was almost impossible to tell whether the motor was pulling its power or merely building up heat slipping its belt, although a little resin once in a while helped.

Before finally dropping this particular whirling arm, however, the work with wings went on to development of what I call the "fly-type wing," with a stiff leading edge spar and curved torsional spars running back to the trailing edge. However, this wing did not give the results of the original crude curved stick and tissue paper, since the fly's wing is concerned as much or more with *lift* than it is with *thrust*, and a lot of the wing area was not in this mere flapping hinge thrust area but just parasite surface. Tip angles gave the thrust, and the rest of the area just prevented the wing from beating up and down any faster without doing any real helpful work, and so there began to be some studies for a next step.

Getting back to the insects themselves, in slides we illustrate different types of wings used by various insects. In my opinion, if we built a flying machine of the flapping-wing type it would probably be more like the dragonfly illustrated on pages 34 and 35—a four-winged affair, rather than a house-fly two-wing—since the present type of power plants cannot depend entirely on power but must have sufficient area to support the plane and glide to a landing if the engine should quit.

We photographed dragonflies' wings just to check the structure of an insect's wing: the complex nature of the joints, the possibilities of effects of changes of blood pressure in the tubular spars, the structure of the hinge joint and its angle at various points of flight. These can only be hinted at here.

The more I studied the dragonfly, the more it became apparent that the first thing to do was to take one wing and weigh what phenomena could actually be uncovered. It was not so much a case of starting out to solve a problem but to build some apparatus to see a little more clearly what the problem was that we were trying to solve.

And let it again be stated that this paper draws no conclusions, but outlines a new field of research that is open for those who want to get in on the ground floor of something which, in my opinion, has great future developments in store.

With my mind more or less on the flapping variety of thrust accomplishment, there still was the insistent publicity and excitement regarding helicopters. But suddenly the thought came, "what is the difference between whirling one blade in a complete circle, like the helicopter, or two blades in a half circle?"

Suppose the helicopter, instead of rotating the wing, had two blades on opposite sides and moved each one in a half circle. That would accomplish the same end, but the very thought of having to reverse these blades at each end of the stroke a couple of hundred times a minute gives a structural man the jitters.

However, the problem is not as bad as it seems. The two blades from opposite sides come together at the end of the stroke if you want to make a complete half circle, so that between these two wings can be built up an air pressure, an impact for an extra amount of strength at the end of each stroke, using up the inertia and taking it off at the end of each stroke.

This is what you hear when birds take off suddenly in a steep climb and the wings hit each other at the top and bottom of each stroke.

A little later I saw an insect, later identified (hearsay only) as an "ant lion," buzzing up and down a window pane trying to get out. The angle of the body of the insect was about 30 per cent from the vertical but the wings were vibrating on a horizontal plane fore and aft exactly in the way I visualized the helicopter.

On studying different insects, it became obvious that this was its method of flight for vertical support. A new type of motion of the wing became obvious. When a wing merely flaps up and down from a central supporting hinge there is plenty of thrust at the wing tips, just through the flexibility of the wing, to give you all the forward flight thrust necessary. As stated before, there was a lot of unused thrust area with the fly model type of wing. But when the wing moved forward this became merely supporting surface, with the plane getting the thrust and the rest of the wing furnishing the lift.

The wing was nothing but a fan. Imagine an ordinary palm-leaf fan held in your hand. When you twist your wrist the fan makes an arc with the handle running through its center of pressure so that this fan forces the air out directly away from the handle.

If a bird's wing were constructed on that basis it would merely thrust air out in both directions on both sides and nothing would go to the rear. But in the old days there were other types of fans used, where the fan handle was along the leading edge and the blade was shaped more like a hatchet. When this fan was waved up and down like the ordinary palm-leaf fan, the handle was also twisted.

As a matter of fact, even when you naturally use a palm-leaf fan you don't hold the handle at right angles to your twisting arm but at about 45°, so that there are two distinct radii of flapping in the wing: one from the root to the tip, and another simultaneous from the front spar to the trailing edge. When this double motion comes in the entire fan is active and the entire wing thrusts.

If we now take the fly-type wing, which could only give thrust around the tip in horizontal flight and horizontal flapping, and get the wing to flap in two directions, then the entire area becomes lifting surface, the entire wing a vertical lift propeller, and we have a new imposing increase of lift with the same surface when we want to spend it all for power lift and not for horizontal speed.

And so the "ant lion" and other insects have their wings pivoted in such a way that the trailing edge moves around the leading edge as a pivot as the wing flaps up and down. Through large arcs of operation, the wing actually does become a helicopter; in effect, two full connecting half circles of thrust. Then, after the insect is off the ground and in flight, amplitude decreases, the wing tips do more of the thrust work, the wing does more of the lift from the speed of progress, and we have a machine very efficient in horizontal speed—impossible in the helicopter.

In other words, with the flapping wing you have the possibility of helicopter take-offs and better-than-airplane forward speeds. Also, full engine power and flywheel effort can be used for hovering, landings, and vertical descents, after we learn more about what the wing does. The principle is there, and all the rest is accomplished except the engineering. The different shape of the ant lion's two wings, shown in Figure 2, indicates that this particular insect was undoubtedly de-

FLIGHT CURIO—

STABILIZER DIHEDRAL

BY INCREASING dihedral in the stabilizers of some military planes, engineers discovered that directional stability is improved and tail flutters resulting from turbulences kicked up by propellers are minimized. And tests have shown that the added uptilt has the effect of increasing the vertical fin area.

Among the planes having high dihedral tail surfaces are the Martin *Marauder* with an 8° tilt; Martin *Mars*, 14°; Douglas *Havoc*, 10°.

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MORE SPEED MORE SAFETY

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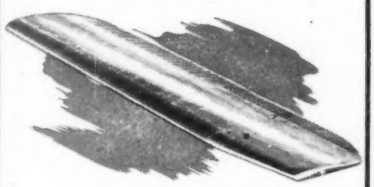
SAFETY—SILVAIRE'S exclusive *safety zone* cabin puts the greatest strength in the cabin area. All-metal airline construction throughout, plus the *safety zone* cabin, gives maximum protection at all times.

PERFORMANCE—it's tops. With the highest performance of any 65 horsepower personal plane, SILVAIRE has the "feel" of a heavier plane. Capable of performing advanced aerobatic maneuvers, SILVAIRE handles smooth as silk. Ideal for training because greater speed gives more instruction time per flying hour and gives the advantage of side-by-side instruction.

ECONOMY—The *only* all-metal airplane with 65 horsepower economy, it costs no more per ground mile than a medium-priced car—gets over 20 miles per gallon of gas. All-metal construction means lower maintenance costs, less depreciation, no recovering jobs and lasting beauty. Priced at less than $3,000.
Also available — the 85 horsepower SILVAIRE DELUXE — for those who desire extra advantages in comfort, beauty, design and utility. Its gleaming all-metal beauty, luxurious appointments, economy of operation, greater speed and longer range make it a pilot's dream.



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Gives 5 to 8 mph greater speed—stressed for more than 6 G's in normal flight. Lasts a lifetime, never needs recovering, easy to keep clean, flashingly beautiful.

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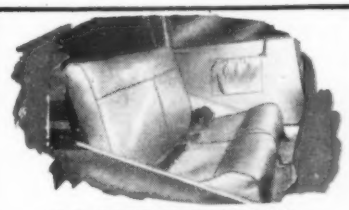
Specially designed tubular steel with stainless steel tie-rods that withstand loads of 14,000 lbs. Cantilever knee-action landing gear with hydraulic shock absorbers makes landings gentle and easy.



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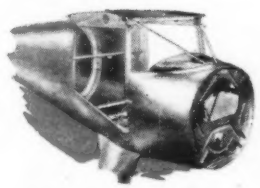

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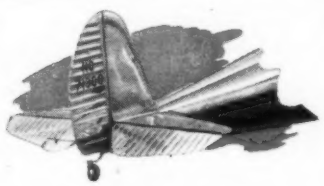

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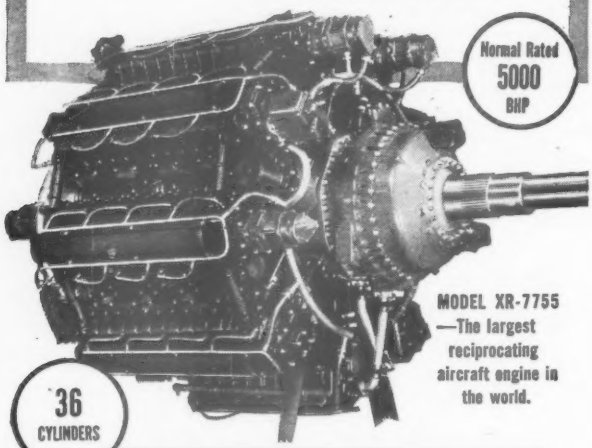

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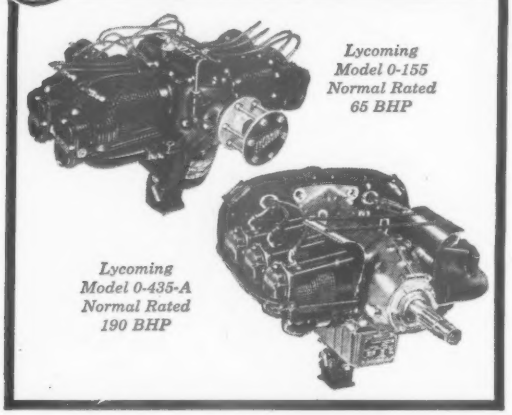

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signed largely for hovering flight as can be seen in the illustration on page 35.

And now came the building of some slightly better apparatus to try the next step!

This time a little larger motor—a worn out vacuum cleaner unit—was chosen as a power plant.

The "gefloppter" arm was made almost the same as the first one, except that now a shaft-drive ran along the top of the spar out to the long end of the beam. Here there was a gear reduction from a pinion on the end of this high-speed drive to a large-sized gear below. On the side of this was a crank from which the connecting rod ran up to the pivoted wing above, as shown on page 35.

I have tried to show in rather complete detail the construction of this apparatus, since if others are going to follow these experiments and we are to get any comparative data at all, the standardization of the approach should be of definite advantage. Since this is very easy to build, it might be a good place for different schools and laboratories to start. At any rate, this geflopigator is an intensely interesting piece of apparatus to which you can fit different types of wings. This latter whirling arm was built about a year ago in my own shop.

The first wing was made of pine, string, and tissue paper, with some liquid glue and shoe thread. This first wing lasted about a minute then went all to pieces.

This was the first idea of what stresses I would have to take care of. From cut and try, I began to develop the technique of small wing building.

The first one to astonish me was "46-A," constructed with spruce spar, *split*, not cut, from a piece of spruce and shaped as shown. The tips of all spars were made of bamboo fastened with glue and thread on the trailing tips of the spruce spar. Various materials were used for covering: tissue paper, tracing paper, gold beaters skin, saran, cellophane, and much difficulty was met in getting smooth surfaces and even tension throughout the wing, something not yet solved.

But the few figures of what happened when the current was turned on to the new whirling arm with the 46-A wing showed that we had discovered something well worth pursuing.

A great deal of study needs to be done with a strobotac and highspeed photography, not only on the insects themselves but on the apparatus that is built up to see what it is actually doing, rather than having to guess at it.

For the first year, this experimental work was a sort of birdshot series of tests; more or less empirical searching in all directions for the best approach to the problem. The final concentration was on the so-called "fly-type" wing, in an attempt to design rather than just cutting a few sticks and paper.

Apparatus is now built for testing the various components before they are assembled into the wing proper: First, the deflection of each spar under a given weight to standardize the different experiments; second, flying wings of different stiffness fore and aft, and from root to tip, to see by tests and strobotac operations just what these changes gave in thrust and lift.

In the fly-type wing there is great chance for a combination of airplane and direct lift effect: this insect wing is primarily a direct lift design, with the wings operating more or less horizontally most of the time.

Another item of great interest in the insects is the method and angle of wing attachment of various insects.

The ant lion has wings that are set on the body at almost a 45° angle fore and aft, but with an entrant angle in vertical plane view. This combination of angles fastening the wing to the body give the wing its distinct double-flapping characteristics without added mechanism—a study in direct lift.

By another year, enough definite material should be available so that one can begin to build double-flapping pieces of apparatus under greater power and with some real stress analysis involved in wings, so that one can at least accomplish control and stability preliminary to flight, and obtain thrust characteristics on a model suspended with wires with a parallel ruler effect so that some of the definite control problems that will come in when flight is attempted might be approached.

It might even be possible to build a single-runner sled for the ice with flapping wings, which will keep it balanced and also steer, to enable the inventor to get a little skill before going too far with actual take-off experiments, which are still many years off.

And so I respectfully submit the newest and oldest approach to the flight problem. END

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Pylon Polishers

(*Continued from page 50*)

put his acrobatic skill to good financial use. With $1,250 he purchased a surplus *Lightning* intending to work up a stunt routine for air shows.

From his engineering associates at Lockheed, he obtained advice in stripping the plane and modifying it for acrobatics.

His first public demonstration was at an aerial show staged by the Los Angeles *Examiner*. He worked out a crowd-thrilling routine of double Immelmans, Cuban eights, inverted flight, inverted rolls from 100 feet off the ground with one engine feathered, a vertical dive from 12,000 feet at an indicated 525 m.p.h. and a vertical zoom, a vertical dive with both engines dead, low rolls, a dead-stick landing, and a final bow to the grandstand by sudden braking, which bowed the *Lightning's* nose and raised the twin tail.

He stole the show. So enthusiastic was the public's reception that Tony was asked to repeat his stunts at the Cleveland National Air Races.

Tony made a big discovery at the Los Angeles event: his *Lightning* was a lot faster than he had believed possible. This unexpected speed began to bother him. Maybe he should enter the Thompson Trophy Race. But then again, he knew his plane was hopelessly outclassed by other crafts already entered. What chance would he have? Still, there was that newly discovered extra speed. . . .

His dilemma was decided mainly by his superstition over the numeral "3." If he entered the 1946 event, it would be his third time in the Thompson. The first time he cracked up. The second time he placed second. Who knew what would happen the third time?

His close friends also helped. They included Glenn Fulkerson, Bob Brown, Ralph Conover, Charles Christman, Glenn Holman, Bill Jones, Bob Spohn, Frank Harvey, Gus Giesler, George Yates, Robert Rogers, Maynard Guilford, John Shearer, Harry Hansen, Wayne McNamee, Harold Krenn, Herman "Fish" Salmon, William Spruer and Robert Miller—all able *Lightning* experts. They told Tony that if he would enter they would all take vacations or leaves-of-absence and drive to Cleveland to help him.

The clincher came when one of them brought up this idea: the 12 fastest planes will qualify for the Thompson. The next 12 will be eligible for the consolation event, the 240-mile Sohio race. So, they counselled Tony, if you don't qualify for the Thompson you'll stand a good chance of winning first place in the Sohio and the $8,000 prize money.

LeVier knew that he hadn't much chance in the Thompson against faster *Mustangs*, souped-up *Airacobras*, *Kingcobras*, *Corsairs*, and others. With increased r.p.m.'s and manifold pressure, his engines could develop at best 1,700 h.p. each against the 2,000 to 2,200 h.p. competing planes would develop. Further, his plane was stock and the turbos had been removed for stunting. But he was not going to Cleveland for nothing. He would enter the Sohio after his acrobatic exhibitions.

Tony's party went in four automobiles and a trailer—the trailer carting everything that might be needed. LeVier flew in ahead and managed to rent two homes, both close to the field, thus saving a long drive to the airport from Cleveland.

While he and his crew were preparing the shining red plane for aerobatics, race officials and Thompson entrants asked LeVier if he would check the speed course for them. Qualifying already had been postponed two days because of poor marking around the pylons. To this LeVier agreed.

It was during this run that Tony found that his *Lightning* could get up to nearly 390 m.p.h. on the straightaway!

"That's impossible!" Tony tried to convince himself. "It can't be true."

But it was. After reporting on conditions of the course to the other pilots and officials, LeVier told his cronies of his amazing speed. They, too, were skeptical. However, LeVier made a secret run just for their benefit and was clocked from the ground at 379 m.p.h. That night there was a big huddle of the LeVier contingent. What should he do? Try to qualify for the Thompson? Or hold back and be sure of getting an even break with planes of more equal speeds in the Sohio?

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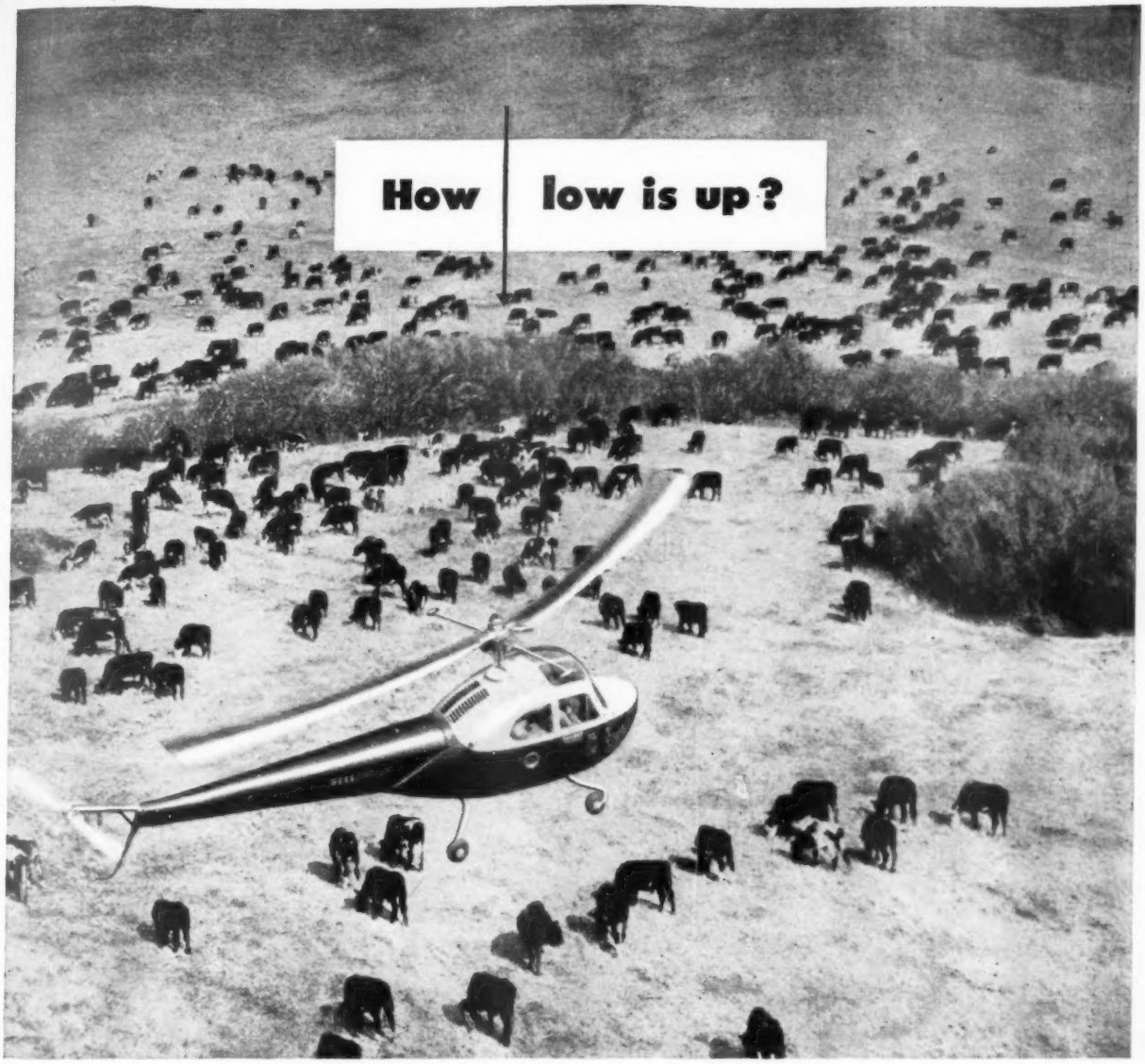

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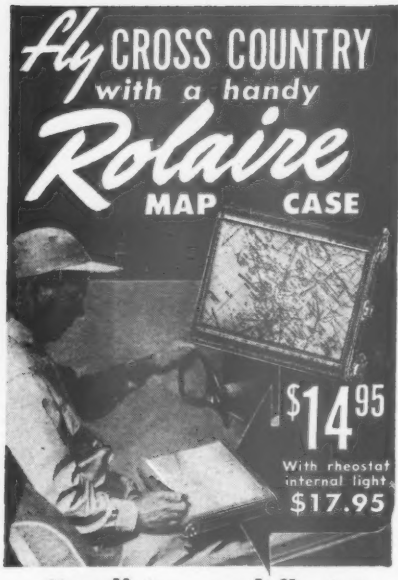

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Glenn Fulkerson spoke up. "I'm in favor of seeing you open that thing up and qualify for the Thompson—then get in it, win, lose or draw."

That was the consensus and LeVier qualified officially the next day at 376 m.p.h. All along the course during that run Tony couldn't figure out how he was getting that much speed. "Something must be haywire," he thought.

His main fears were Alvin "Tex" Johnston, who turned out to be first place winner; Jack Woolams, Bell Aircraft's chief test pilot, killed in his racer a few days before the race—both of whom qualified in *Airacobras* at 406 and 397 m.p.h. respectively—Charles Tucker in a clipped winged *Airacobra*, George Welch, Bob Swanson, and others in *Mustangs*.

After his final stunt show on Sunday, the day before the Thompson, LeVier turned the plane over to his voluntary crew to prepare it for the race. He and Mrs. LeVier went out that night and returned at midnight to find the house empty. About 5 a.m., the crew awakened him with bad news.

The fuel system in the *Lightning* had gone bad. One special fuel transfer pump had been left back in Burbank and it was too late to have it air expressed in time for the race. They had tried to devise a new system and they thought they had figured one out. But they were worried. Maybe you can't race, they told LeVier. But after a few short hours of sleep and then hours more of frantic labor they had the system functioning perfectly—just two hours before starting time.

During this time, however, one of their main secrets was exposed to the view of other entrants.

Herman "Fish" Salmon, another Lockheed test pilot of *Lightning* spin fame and a close friend of Tony's had suggested the use of Scotch tape to cover seams, caps, dive flap apertures, rivets, etc., to make the plane faster and cleaner aerodynamically.

Equipped with rolls of scotch cellophane tape, Tony's helpers were applying it when several other pilots mozied over and immediately caught on. They began to beg Fulkerson for enough tape for their own planes. His philosophic reply was:

"Look, guys. If it were an airplane part you needed, or something which was necessary to keep you in the race, we'd be glad to let you have it. But we kinda figure this tape idea is a speed secret all our own. You know, we'd feel a bit unhappy—to put it mildly—if we'd share our tape with you, and then have you beat us out in the race by a hundred yards or so. You probably wouldn't feel too good, either. The answer is 'definitely no'."

Then began a wild scurry over all Cleveland for 10-cent rolls of tape. Most of the pilots were too late and what little tape they could obtain was of small help.

Thirty minutes before the start of the race, Tony was on the line. His lucky number "3" was almost charmingly overdone. His wife had given him three kisses. And he carried three goodluck pieces.

LeVier was in fourth position from the pole on the starting line. At five minutes before take-off a red flag went up; at one minute to go a white flag went up. Exactly at 4 p.m., it came down and the race was on. But at that time LeVier was looking at his watch, counting the seconds. He jerked his head up when the three inside planes roared to a start.

He was only open to half power, but rammed the throttles forward in an attempt to catch up with the other planes. At the home pylon he was in third position.

George Welch and Johnston were out in front of him but five miles down the first leg LeVier passed Welch, whose engine was smoking. On the next turn he ran into difficulty when he couldn't find the exact marking for the pylon and turned wide. This altered positions considerably, as several others overshot the mark, but soon after Tony was back in second place, trailing Johnston.

"I then settled down to a nice, easy race," he relates. In front of him he had 10 tape tabs. On each one he had printed cockpit procedure he was to perform during each lap. This mainly consisted of fuel valve changing sequence. On the third lap he passed Tucker and waved a "Tough Luck Charley" salute. Tucker's gear was stuck in the down position, causing his retirement from the race.

As the race progressed, LeVier kept getting closer and closer to the pylons on turns. He found himself pulling from 2½ to three "G's" on each turn, although his preflight plans were not to pull more than two because this was found to be the optimum for faster speed. The race was rugged. The air was rough and his G-suit was inflated almost constantly. On several fast laps, when he crept up noticeably on Johnston, he was indicating close to 390 m.p.h. on the straightaways.

After the race, both Johnston and LeVier went one extra lap, neither quite sure that the checkered flag had been waved. When LeVier started to land he hit the flap lever, forgetting for a moment that the flaps had been taped up. He later found that the tape was so strong that the left outboard flap remained sealed, although all the cables and pulley brackets were pulled out.

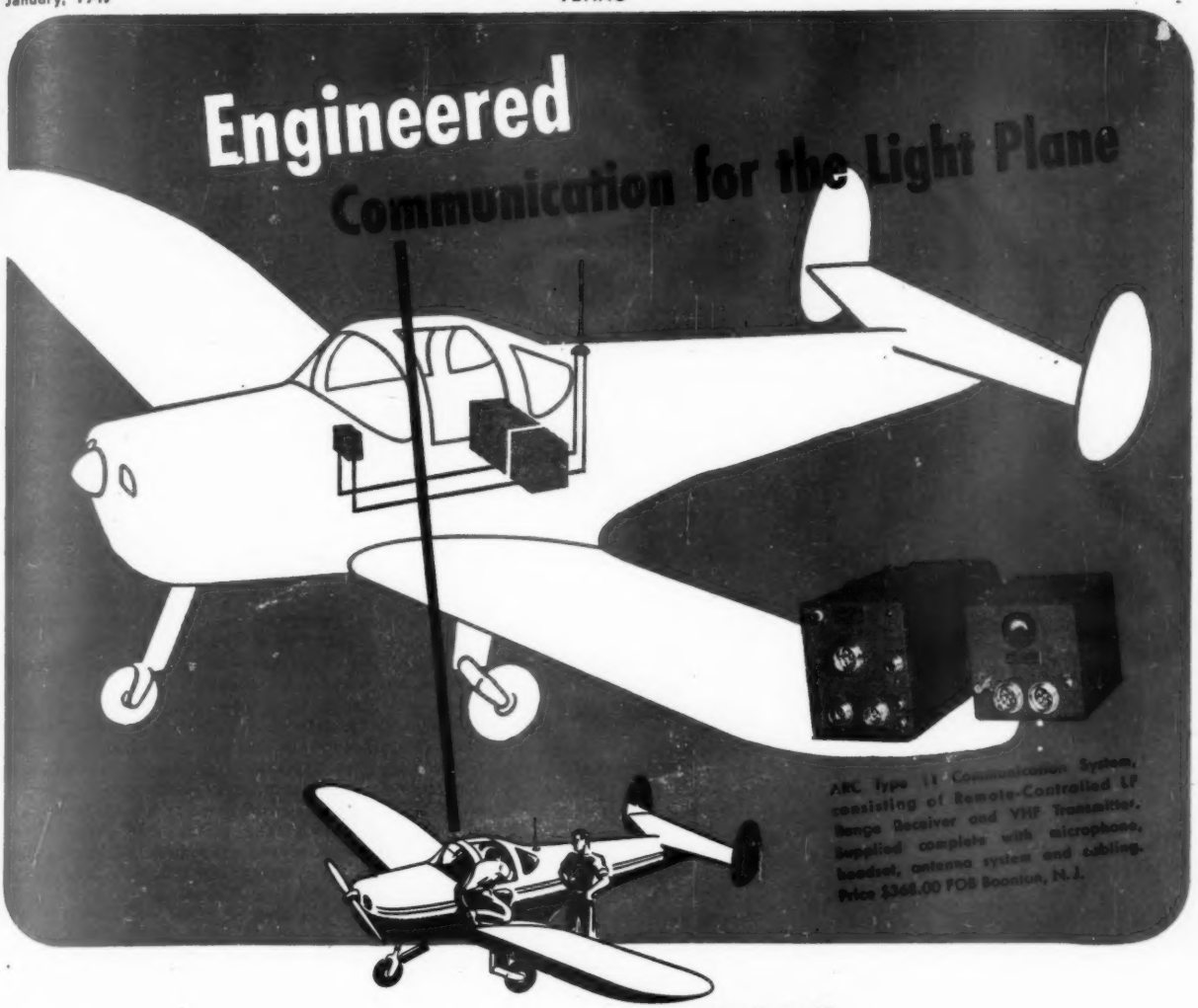
"Boy, was my gang a happy one when I landed!" Tony exclaims.

He then told them that he had set his mind on flying the race low and easing into the pylons a mile away, making 60° banked turns, which were executed perfectly because his counter-rotating propellers provided no torque problem. He said he had flown at 3,150 r.p.m. and 64 inches of mercury, using 130 octane and grade 160 fuel. Some of the others, however, were using from 85 to 90 inches of mercury.

"I made several fervent prayers to keep going during the race, and I guess I've been living right, because they were answered," Tony confided. "We had a lot of good breaks while the others were having bad ones."

He flew Fulkerson back to Los Angeles piggy-back in the red money-winner. Fulkerson tells how every so often LeVier would lean forward, pat the top of the instrument panel and praise:

"Whatta plane! Whatta plane!" END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The Mad Cats

(*Continued from page* 44)

across the Strait. And it was those stingers that gave the *Catalinas* on which they were installed the name "MAD Cats."

That word "MAD" in the title is made up of the initial letters of the stinger's official tag—Magnetic Airborne Detector. The idea for such a device was born back in World War I, when a sharp-eyed pilot on a coastal patrol flight observed that his compass was deflected by a submerged submarine. Enormously refined, the idea culminated in MAD equipment. The scientist will tell you MAD consists of "an extremely sensitive magnetometer which measures the anomolies in the earth's field." To the average man it is simply a remarkably ingenious device which warns an airplane pilot when there is a submarine in the vicinity and records a signal when his plane is directly over the submerged craft.

Patrol Squadron 63 was the only Navy air unit that was completely equipped with MAD during the war. With it that one squadron set up an aerial fence across the Strait of Gibraltar (during January, 1944) that blocked entrance of enemy subs and made the Mediterranean an "Allied lake."

To understand why the Mad Cats were so effective at the Strait, one must picture the situation there (see map on page 44). Europe and Africa are only eight miles apart at its narrowest point. There, from the mighty Rock of Gibraltar, the British have dominated the entrance to the Mediterranean for 240 years.

But the bristling "rock" was little protection against U-boats. At least three dozen of them had made their way through the Strait by January of 1940. And their improving "daylight-submerged" technique promised an ever-growing submarine fleet and a constant menace to Allied supply lines to Mediterranean fronts.

Then Squadron 63 arrived at Port Lyautey in nearby French Morocco with a plan for "fencing the Strait." Two Mad Cats were to shuttle back and forth across the Strait's deep-water channel (which the subs had to use) at its narrowest point outside the three-mile limit. Flight pattern was to be shaped like a race track at altitudes of from 50 to 100 feet—the nearer the water, the greater the depth range of the detector. In theory, a Mad Cat was to pass over every point in the pattern every few minutes and no U-boat could pass through that area without being detected and subjected to lethal attack by rocket bombs.

Those bombs are a story in themselves. The conventional bomb dropped from a plane does not go straight down. It continues ahead in ratio to the speed of the plane, striking the surface a considerable distance ahead of the spot over which it was released. Use of MAD detection required that bombs go straight down, however. The solution was to couple rocket motors to 65-pound bombs filled with Torpex (a new explosive more powerful than T.N.T.) so that they would fire backwards off the wings at 100 knots, the speed of the Cats. With 15 bombs to each wing, the 30 units were released electrically by the MAD to cover a wide pattern. Each had a contact nose fuse, and only one had to touch the pressure hull of a submarine to crush it like an egg shell.

The aerial "fence" at Gibraltar was put into operation on January 23, 1944, but a full month was to pass before the first victim, the U-761, entered the trap. On that day two "Mad Cats" had been making their patrols along the "fence" since early dawn. Plane No. 15 was commanded by Lieut. (j.g.) T. R. Woolley, and Lieut. (j.g.) H. J. Baker commanded No. 14.

Suddenly the first signal was picked up by the MAD in Woolley's plane, and he quickly swung out of his course. Baker flew No. 14 over to join in the tracking.

And then one of those maddening things happened which make war what Sherman called it. Two British destroyers, the *Wishart* and the *Anthony*, patroling the eastern entrance to the Strait, noticed the unusual activity on the part of the planes, and steamed over to investigate. They blithely knifed their way in, forced the planes out of their low-altitude patterns and disrupted the search.

"Turrets from Navy 14," screamed Baker into his microphone. "Stay out of the area until we signal you. Dammit, we've got a contact!"

But the destroyers had done their damage; the contact was lost. An hour passed before the planes picked up the sub again. This time they were taking no chances. On his next turn, Woolley went in for the kill. Then Baker made his attack with 30 more 65-pound chunks of Torpex.

The planes continued to circle, their crews watching with solemn awe as the bow of the U-boat broke the surface, the conning tower opened and real live Germans appeared and began to throw themselves into the water.

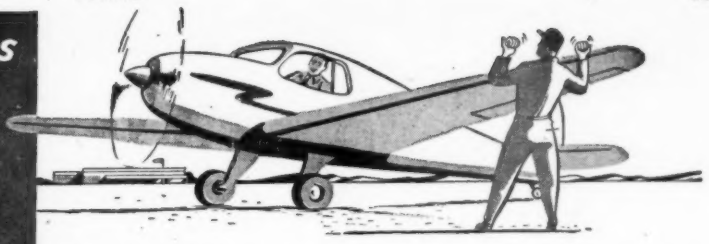
Suddenly there was a terrific explosion in the U-761 as the scuttling charges went off, and it slid back beneath the waves for the last time. As the *Wishart* picked up the survivors, including Von Geider, a circular froth of bubbles was all that marked the death of the U-boat.

One important lesson had been learned in that first attack. The interference of the British destroyers which almost lost the sub for us resulted in the skippers of British patrol vessels in the Strait being ordered to Port Lyautey for a brief schooling in MAD tactics. The officers of the Royal Navy learned that surface vessels actually can be in the way of planes circling at 50 feet of altitude.

Squadron 63 had its next big chance on March 16 when intelligence reports pointed to the probability that another sub had come down from the French Biscay ports and would attempt to run the Strait that day.

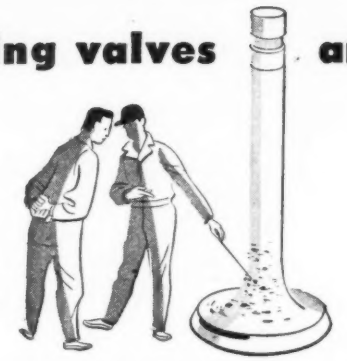
Dawn found two "Mad Cats" already in the air beginning their routine circuit, while a third "Mad Cat" took off to fly a reinforcement barrier at the eastern outlet to the Strait. The attempted breakthrough was discovered just before 9 a.m. But before the planes could attack, a Free French submarine, escorted by a French sloop, sailed to the area, en route to Gibraltar from Casablanca. Mad Cat crews proceeded to make radio waves hot

STANDARD OF CALIFORNIA'S PLANE FAX



A page of service tips for private flyers and fixed-base operators

Sticking valves are often traced to lead deposits



Sticking and burnt valves in personal plane engines not designed for leaded fuels, are often traced to lead deposits caused by using gasoline which has been fortified with tetraethyl lead to boost octane rating. To eliminate this danger, Standard of California provides an unleaded 80-octane Chevron Aviation Gasoline. A high proportion of "alkylates" (blending agents used in fighter plane fuel) are used instead of tetraethyl lead to achieve Chevron Aviation Gasoline's high-octane rating.

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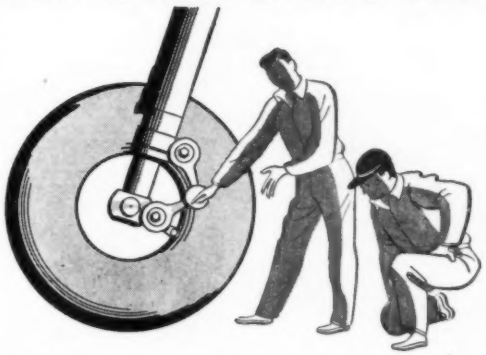
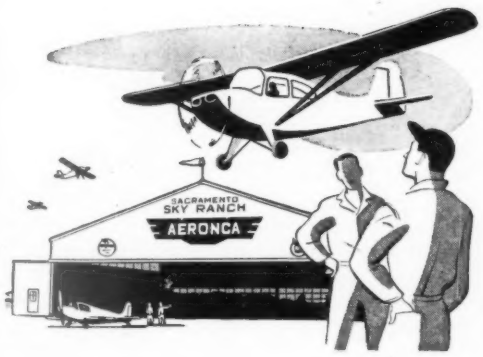
When brakes of even a light airplane are applied, friction shoots temperatures to high levels. A grease not built for such heat, melts, runs out on brakes and wheels. To assure complete protection under top temperatures, be sure your plane's wheel bearings get RPM Aviation Grease No. 2. It's built to stand high temperatures, therefore it won't melt and run over brakes, neither will it congeal at low temperatures and lock wheels. RPM Aviation Grease No. 2 was especially designed in Standard of California laboratories to meet aircraft problems.



Flight school finds new oil doubles overhaul interval



John Schwaner of Sacramento Sky Ranch writes: "Last year we experienced considerable ring and valve sticking when using a popular uncompounded oil in our 65 hp. training airplanes. We then ran careful flight comparison between the above oil and RPM Aviation Oil. We experienced valve and ring sticking between 300 and 400 hours in the engines operating on the uncompounded oil, while the engines on RPM Aviation Oil ran more than 700 hours with excellent results."

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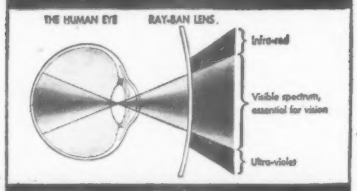

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with carefully chosen invective. But the sloop and sub continued unperturbed through the strait.

It was a half hour before the pilots could pick up their quarry again. Then, with its course and speed established, they went in for the attack. Swirls in the water and explosions heard in the hydrophones of British frigates nearby indicated that hits had been made. The frigates came in on Mad Cat call and gave the *coup de grace* to the stricken sub. It never got to the surface. Oil came up, splintered wood, even bits of human flesh, but the U-boat became the crew's coffin.

Nazis were desperate in May of 1944 as the war of nerves mounted before the impending invasion. For months they had been blocked from sending a U-boat into the Mediterranean. And those already inside had been picked off one by one, or had holed up in Toulon or Marseilles, unable to get back to their pens for repairs or overhaul. With an invasion about to strike, the Nazis planned a new technique for slipping through the Strait.

On May 15, two Spanish fishing vessels (called *parejas)* entered the Strait just off Point Malabata, steering a straight course which kept them just inside the deep water. The planes flew over to investigate, the pilots only mildly suspicious until one of them picked up a strong signal on the port beam of the *parejas.* The Nazis were trying to slip a U-boat in under the *parejas.*

Both planes immediately proceeded to track their game, swooping over and around the fishing boats as they scurried desperately to shallow water. The signal was strong now toward the channel, so the Cats went in for the attack and were rewarded with freshly splintered wood bobbing to the surface.

That was not evidence enough for the pilots, and the familiar call for surface support went out over the short wave. Patrol vessels came in with hedgehog rockets firing and worked over the position marked by the planes. More debris came flushing to the surface, including an oil slick which widened and drifted down through the Strait. By morning it was 12 miles long. The Nazi trick had failed.

That's enough to indicate the sort of thing that comprised the Mad Cat stint until, on August 9, the Western Task Force struck at St. Tropez and the Riviera beaches. Battleships, cruisers, carriers and destroyers steamed to the French coast and supported thousands of landing craft as they disgorged an invading army. Thanks to the "Mad Cats" not a single ship in that great invasion fleet was even attacked by a U-boat.

Patrol Squadron 63 continued to do its job until the end of the war. The Gibraltar fence was maintained until V-E Day, while in January, 1945, a detachment from 63 set up a similar aerial barrier in the English Channel. There, still one more sub was blasted to destruction. As a fitting conclusion to their tour of duty, one of the Mad Cats accepted the surrender of a U-boat off the Strait, and the pilots had their first chance to inspect at first hand the quarry they had hunted with typical American ingenuity, perseverance and with such a full measure of success. END

Aviation's Best Sellers

(*Continued from page* 28)

the flyer most desires to see—forests, good landing spots, routes and obstructions. These complaints were relayed to both CAA and Coast and Geodetic chart experts at a recent meeting of CAA private flying specialists who had come in from the field to report pilot reactions. The consensus was that alterations would be made as fast as production permitted but that the charts are already overcrowded with data and it would be impossible to put all the features desired by all pilots on all maps.

At the same time pilot suggestions for changes and improvements are welcome and may be made directly to the Director, Coast and Geodetic Survey, Washington 25, D. C.; to Kenneth Keefe, head of CAA's aeronautical chart section, or to CAA private flying specialists in the field. These last are the most enthusiastic advocates of changes aimed at revising the charts so that they will read like the automobile road maps which are still popular with some pilots for contact flying.

One of the developments coming out of the war is a new color for aeronautical information such as airports, beacon lights, radio ranges, radio call letters and identification signals. These were formerly shown in red. During the war it was discovered that red faded out under cockpit lighting used in military planes, so experts developed a magenta color visible under any standard lighting.

Approximately 300 persons are employed by the Department of Commerce in producing aeronautical charts (of which, including the sectional world aeronautical, instrument approach and landing charts, there are nearly 800). The modern-day U. S. aeronautical chart library includes planning charts for plotting routes between distant points; radio direction-finding charts; approach charts; Alaska, Philippine Islands and Hawaiian Island charts; and auxiliary charts of varying scale, one of which is a great-circle aeronautical outline of the United States. Another shows U. S. airline distances. The sectional and world aeronautical regional charts model for international aeronautical maps is now being adopted by the interim council of the Provisional International Civil Aviation Organization.

As for the future of the 87 sectional charts, of which about 4,000,000 were printed in 1946, steady improvements aimed at meeting pilot needs are planned by both the CAA and Coast and Geodetic Survey.

"The day may come when charts will be three-dimensional, either by physical construction or stereoscope application," says Kenneth Keefe, chief of the CAA chart division. He adds that the time may also come when "a magic pencil may trace the course of your plane automatically on the charts, and there will be automatic visual radio fixes plus a bell or red light to warn you when you are off course or in danger of crashing into a ground obstacle."

END

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Airpark by Law

(*Continued from page 47*)

services, or any other service for which a charge or fee is collected.

A private operator is defined as a person owning or operating an airplane from the airpark for personal uses only. For the private operator the yearly city license fee is only $5.

Members of any group associated together as an aviation club, society, or organization must secure a club license. If club planes are put only to personal uses the license fee is $3 per year per member. If planes are rented out or used for any other commercial purpose the club must obtain a commercial operator's license.

The most unique feature of the ordinance is the occupational tax. All holders of airpark commercial licenses must pay to the city a tax based on five per cent of their gross income derived from the planes and services licensed. Each commercial operator must file a complete statement of gross earnings each month, accompanied by his five per cent cash on the line. The first monthly tax and license returns from commercial operators netted the city $1,268.

So far the plan has worked well. Although airpark licenses are subject to revocation by the manager and the city council, no licenses have been revoked since the ordinance went into effect September 11, 1945. This is remarkable since all the regular Civil Air Regulations are included in the ordinance.

The organization of the Eugene Airpark was no hurry-up job. Soon after the war ended, City Manager Deane Seeger, Mahlon Sweet, long regarded as the "daddy" of aviation in the Eugene area, and a few other air-minded citizens saw the tremendous possibilities of the field in the postwar flying boom. The airpark is only 15 blocks from the main business section and lack of operational hazards makes it an almost perfect answer to the problem of providing a safe, efficient and convenient airport.

An Airport Commission was established as a regular part of the city government. This commission sets up airport policies and makes recommendations to the city council for carrying out these policies. Elisha Large, a former mayor of Eugene, is the chairman of the commission and Mahlon Sweet is a member.

All has not been smooth in the development of the airpark. City Manager Seeger, the Airport Commission and Airport Manager Harry Francis, have run into many disappointments in their program. The airpark still needs many improvements as well as a great deal of equipment.

The goal of the city administration was to make the airpark self-supporting. Until extensive plans for modernization and expansion are completed, this goal will not be realized. The funds now set aside in the regular city budget for airport development are being held down by more urgent demands from such essential departments as street maintenance and fire and police protection. Officials are confident, however, that within several years the airpark will definitely begin to pay for itself.

When the new municipal field, named for Sweet, was completed a few years ago, many thought that the present airpark property should be disposed of as quickly as possible. But it remained in city hands and the airport planners found themselves with a field already on hand when it was decided to serve the needs of the private pilot as well as those of the airliner.

The field has been used as a landing area since 1919. It has a rich background of early aviation lore. In 1919-21 it was the base for an Army forest patrol squadron under the command of a certain Col. H. H. Arnold, later the head of the world's largest air force.

The field's two main runways—a 2,600 foot northwest-southeast strip and a north-south strip 2,430 feet in length—are now gravelled but future plans call for all-weather paving.

There is need for hangars which the city is not now prepared to finance but a plan has been worked out whereby operators themselves can construct them if they so desire.

Operators would pay the city as yearly space rental 10 per cent of the cost of hangars. Such payments would be credited to the operators on their occupational tax, with the hangars becoming the property of the city after 10 years. This plan has met with the approval of the five commercial operators now using the field.

These five operators and the owners of the 50 planes permanently based at the airpark have raised no major objection to any provisions of the ordinance or the city administration of the field up to the present time.

Despite this apparent satisfaction with the way things are going, the city has left the way open for modification of the regulations. There has been some indication of a realignment of the license fee for private operators. As the ordinance now stands it costs the private pilot with three planes no more than the pilot with one. It has been suggested that the fee for private operators be put on a new basis in proportion to the number of planes based on the field. It is felt that the occupational tax takes care of the difference in number of planes among the commercial operators.

Many of the well-known personal plane manufacturers are already represented by operators now on the field, including Aeronca, Bellanca, Cessna, Globe, Piper, Republic, Stinson and Taylorcraft. The field also houses the aviation branch of the city-operated Eugene Vocational School which gives students a thorough course of training in aircraft repair and maintenance work.

Though operation of such a busy close-in field has produced its problem—among them complaints about noise, financing of modern improvements, and so forth—the Eugene field is hardly unique in that respect. But it is unique in its approach to airport users and operators—unusual enough, in fact, for the American Municipal Association to call attention to its plan as a model which other communities might profitably study. END

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THE STATE OF MISSOURI
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The CAA Goes Overseas

(*Continued from page 27*)

forward under auspices of PICAO—Provisional International Civil Aviation Organization—to co-ordinate with foreign offices of other nations, standardize rules, permit regulation of U. S. pilots abroad by U. S. officials, and generally cut international red tape.

Add all this up—and allow for the fact that the wheels of Government at home and abroad move exceedingly slow—and it means that if you have the horsepower you can soon fly to a score of foreign countries. Lacking the horsepower, you can ship your lightplane to the land of your tourist dreams and fly after you get there, always under a U. S. license and with the help of U. S. pilot councillors in the field. Undoubtedly you will run into some exasperating delays, but you'll have your Government standing by to give you all possible assistance. Formerly you had to come all the way to Washington and walk yourself into a galloping case of corridor calluses to get clearance to any mildly unusual distances. Now you can get started by seeing your nearest CAA representative. And as for the future . . .

"It's going to take time to get domestic field workers informed, simplify international regulations and establish sufficient foreign CAA offices to complete the job," explains A. S. Koch, until recently assistant administrator for field operations, and more than any other one man responsible for CAA policy in this new program.

"But we're looking forward to the day when any U. S. pilot can take off from his home field and fly anywhere in the world with ease comparable to that experienced on a flight within U. S. borders. He will always, of course, have to meet passport requirements. But so far as flying is concerned, our goal is to make the rules for him the same in Timbuctoo as they are at any field in this country."

Koch is conservative when it comes to the question of how soon the program will be worked out. Obviously, the world is troubled and bureaucracy is not an American monopoly. But the work is already under way and some outstanding results have been scored.

Perhaps the outstanding example occurred in Germany recently when soldiers in the American zone asked commanding officers how they could get a license to fly planes bought from Continental AAF surpluses. Army high command checked with Berlin, where zone civilian flying activities are under John E. Sommers, former domestic deputy administrator of CAA. Sommers promptly set up the new licensing in reverse—certificates awarded in Germany for U. S. planes and pilots will be okay when brought home.

Flights abroad under CAA auspices are now limited to nations where Administration offices exist, although it is also possible to make flights to other nations after proper credentials are prepared. Offices are now open or about to open at Paris, Cairo, Shanghai, London, Lima, Peru; Rio de Janeiro, Balboa, Canal Zone; Sydney, Australia, and Mexico City. Plans for two others were underway as this goes to press.

The most immediately available routes for foreign flight vacations are to the south.

CAA offices are now staffed by personnel whose aviation major is in air carrier regulation—No. 1 problem of the U. S. global program. Men whose primary interest is in private flying may be added if demands are great enough. Top foreign CAA bureau chief will be paid $7,000 plus $3,000-$3,500 for quarters and extra living costs, if any. His assistant gets $6,000 plus $2,200-$2,700 for extras. A third technical expert and a clerk will complete a bureau staff. Priority in filling the jobs is being given at present to experienced CAA personnel in the U. S. organization.

To co-ordinate foreign activities in the U. S., regional headquarters plan to appoint a foreign staff officer.

In foreign countries where no CAA office has been established, State Department is in charge of aviation matters and your best bet is to check with the home office, Washington. Best countries to consider for trips are those already having State Department Air Attaches—Livingston Satterthwaite, London; Howard B. Bailey, Paris; George S. Roper, Ottawa; Percy deF. Warner, Rio de Janeiro; Sterling J. Cottrell, Bogota, Columbia; Ralph D. Curren, Cairo; Francis Deak, Bern; Frank G. Jarvis, Shanghai.

On the diplomatic side of the program, work is also progressing, chiefly through the PICAO committee recently organized to streamline customs, health and immigration regulations to avoid delays by air travel. Although negotiations are proceeding slowly, members are optimistic that eventually they will reach their goal—to make private flying abroad comparable in lack of regulation to flying at home.

Significant of State's emphasis on the value of the airplane in international negotiations was the appointment for the first time in history of a man whose life work has been flying and airways engineering, to head a U. S. delegation to an international aviation conference—Charles I. Stanton, former CAA administrator.

Supplementing all this activity is a subsidiary program under which this country sends aviation missions to any other nation requesting them. Most recently Turkey and Costa Rica advised with the American experts. Scores of other delegations are being groomed for similar trips during the next two years. Usually, after the U. S. mission makes its recommendations, American pilots and engineers are invited to come over on a more or less permanent basis and carry them out.

Thus the lightplane pilot bound abroad should, in the not distant future, be able to look forward to efficient aid from his Government both at home and abroad—and plenty of U. S. pilots to make friends with wherever he goes. END

A LOOK AHEAD

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Static and the Airplane Radio

(Continued from page 37)

trailing edge of the wings, atop the rudder and on the side of the horizontal stabilizer, these wicks, known as AN/ASA-3 dischargers, consist of 12-inch lengths of long-fiber cotton cord metalized to make them slightly conductive. Except near the exposed end, they are covered by plastic tubing to give rigidity. They are attached to the plane by an aluminum ferrule.

Several of these wicks placed on the best discharge area of a plane enable it to discharge electricity three times as fast as without them. In addition they produce no interfering noise. They are relatively inexpensive and may be kept in condition by trimming off the plastic tubing until shortened to a minimum of six inches, when new ones are required.

The wick is frayed by the slip stream so that each strand acts as a separate discharger. It requires a strong electrical field to promote the discharging action, however.

In order to develop such strong electric fields therefore, without allowing the corona discharges which interfere with radio reception, it is necessary to alter the design of aircraft.

Plans for keeping sharp projections such as radio antennae and pitot tubes to a minimum and rounding off and reducing the size of all projections were evolved to aid in the quiet discharge of surplus electricity.

An interim modification is the application of a plastic product known as poliethylene to cover exposed antenna parts. One of the most important discoveries of the research group, the plastic makes possible clear radio reception even when the luminous St. Elmo's Fire glows from many edges of the plane.

For years planes were handicapped in performing accurate radio navigation by precipitation static which hampered reception and blocked out signals. Now, however, planes treated with plastic fly through and close to precipitation areas, their radio reception unhampered.

The "Sacred Cow," President Truman's personal plane, is equipped with the plastic, and Lieut. Col. Henry T. Myers reports that on a recent trip across the North Atlantic, when bad weather caused all other flights to detour south, the plane went through without trouble. Snow or some other form of precipitation was encountered over 80 per cent of the trip.

Poliethylene has been used for testing purposes on a number of aircraft at Minneapolis for quite a while. A *Mitchell*, a *Ventura*, and a *Flying Fortress* have all been used in the hangar and flight-tested.

Pending wider use of the preventive measures, the Gunn group has drawn up a set of eight rules to combat precipitation static in currently available planes!

1. Select a flight altitude that will permit safe clearance not only of highest terrain along proposed track but also above adjacent terrain.

2. Use VHF radio for making contact when actu precipitation static occurs. HF will be 20 times as intense in length of time of static interference.

3. Use propeller alcohol when available but if immediate clearing in radio reception is not noticed, turn off alcohol flow to conserve supply.

4. When using the so-called "anti-static" loop, turn it so that it is parallel to the line of flight. Maximum signals may be obtained this way, and it will operate long after conventional antennae are useless.

5. Use the ADF unit when signals are blocked out. Use of commercial broadcasting stations for homing is recommended because they are more powerful than range stations.

6. Successful reduction of periodic crashing noises generally experienced near thunderstorms may be effected by switching radio to "range" band.

7. When using radio range, if quadrant signals are inaudible, listen for the station identification period. First identification is from "N" tower, the second from "A." Whichever is louder is the quadrant you are in.

8. Reduce air speed as much as practicable. Tests have shown charging rate on aircraft is 27 times greater at 300 m.p.h. than at 100 m.p.h.

Pilots must contribute their parts by being alert and using common sense. When the gas is low and the range inaudible it's often too late. Anticipate precipitation difficulties if you would reduce them to a minimum. END

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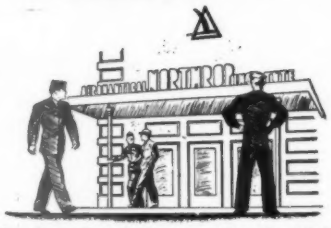

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Lessons from the Liaisons

(*Continued from page* 38)

back from the war, ready to resume their places in civilian flying. Most of the things they did in the battle areas are different from what they will be doing at home but they learned at lot during the war that should be useful to civil aviation. It is an unfortunate paradox that one of the best ways to benefit by their experience is to examine their misfortunes, for they had a good many accidents during their military service as was to be expected in view of the rigorous uses they were put to. They were inexperienced in the ways of war and these accidents do not in any way detract from their distinguished service — especially since their wartime accident history does not compare unfavorably with the record for pre-war private flying. But it is more than possible that by studying their accident records we might discover and correct some of the conditions leading to such accidents. This would further the post-war career of light-planes everywhere.

Liaison aircraft flew over 2,000,000 hours in the United States during the war. Here is the record by model from Pearl Harbor through July, 1945: Piper L-4, 627,000 hours; Stinson L-5, 507,000 hours; Aeronca L-3, 504,000 hours; Taylorcraft L-2, 413,000 hours; Vultee L-1, 132,000 hours; and Interstate L-6, 18,000 hours.

During this time they had a total of 2,400 major accidents, of which a little over five per cent were fatal—approximately the same proportion as for private flying in 1940. A total of 197 persons were killed and 495 aircraft wrecked. The estimated total damage cost was in the neighborhood of $5,000,000.

For the entire war period the rate of accidents was 91 for every 100,000 hours flown, which was high compared with the rate for the AAF as a whole but considerably lower than the estimated rate for private flying in 1940. The latter rate was up around 114 major accidents per 100,000 hours, if you can trust the statistics. But for the sake of argument, let's refuse to trust them and merely say that despite the more hazardous missions flown in the Army, the military accident rate for lightplanes was at least no worse than the civilian rate.

How such an achievement was possible is difficult to say. Closer supervision, perhaps, and stricter discipline, or maybe more complete instruction. And it is likely that by and large the Army had above-average material to work on. In view of the fact that most private flying accidents occur during instructional flying, the combination of these factors in the Army program of training may have helped to cut down the number of accidents early in the game.

The question which has been raised repeatedly is whether, in view of the differences between military flying and private flying, we can learn anything useful about accident prevention in civil aviation from our military experience with liaison planes. It must be recognized that liaison pilots were trained in difficult maneuvers and that often they flew under simulated combat conditions and in weather that the average private pilot would prefer not to fly. It seems reasonable to conclude, therefore, that the two types of experience are so different that we might as well forget about what the Army learned.

But if you dig through a few hundred accident reports, what you find, surprisingly enough, is that, though the flying was different, the accidents were the same.

A fairly good picture of the kind of information recorded can be found in a description of one year's accidents. During the period July, 1944, through June, 1945, liaison aircraft flew approximately 300,000 hours in the United States and had 216 major flying accidents. Here is how the types of liaison accidents compared with private plane accidents for 1944:

LIAISON AND PRIVATE AIRCRAFT ACCIDENTS

Phase of Flight	Liaison Aircraft	Private Aircraft
Landing	31%	37%
Forced landing	20%	20%
Taxiing	19%	15%
In flight (other than forced landing)	13%	17%
Take-off	11%	9%
Other	6%	2%
All accidents	100%	100%

The two sets of figures are not so far apart as you might expect. In fact these accident patterns are remarkably alike. Landing accidents, the most frequent for both types of flying, accounted for 31 per cent of the liaison aicraft accidents and 37 per cent of private flying accidents. The percentage of forced landings was the same for both, comprising one fifth of the totals. Taxiing accidents were somewhat more frequent in army operations, while accidents in flight were more pronounced in private aviation.

There were four principal categories of landing accidents in the Army: hard landings, ground loops, nose-ups, and failures of the landing gear. Specifically, out of the year's total of 68 landing accidents, there were 21 hard landings, 15 ground loops, 13 nose-ups and nose-overs, and 10 failures of the landing gear. Nearly one out of every seven landing accidents was attributed to gusty wind conditions.

The necessity for avoiding cross-wind landings is borne out by the record, for the tendency of the liaison planes to weathercock and ground loop, not only on landing but in taxiing and take-off as well, was an ever-present accident factor. And in all fairness to these ill winds, it should be pointed out that they blow no good for lightplane pilots either.

A considerable number of landing accidents resulted from hitting power lines and other obstacles on approach, and in some cases because of failure to mark obstructions on the airport. One out of every six landing accidents involved trouble with the brakes, including several failures due to poor maintenance. If you are acquainted with the civil accident record, these accident factors will sound quite familiar.

Forced landings in liaison aircraft pre-

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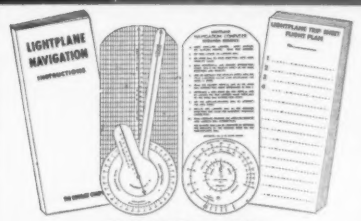

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sent much the same story as the civilian version. Three out of every four resulted from engine difficulties but half of these were of undetermined cause. Of the engine troubles for which some explanation was found, most resulted from carburetor icing and fuel system difficulties. The remaining one-fourth of the emergency landings resulted from being lost and running out of gas.

Other accidents occuring in flight, in addition to those resulting in forced landings, accounted for only 13 per cent of total accidents in liaison aircraft but their serious nature is indicated by the fact that they caused 31 per cent of all washouts. These accidents were predominantly collisions with wires or trees, or flying into the ground, mostly because of attempts to operate below prescribed minimum altitude. It is important to note that these were violations, not authorized low-level flights. Tactical training in liaison aircraft did require some low altitude flying but the importance of limiting this dangerous type of operation was well recognized.

The AAF's Pilot Training Manual for the L-5 says: "Unauthorized low flying is a court-martial offense." A total of 155 low-flying violations in civil flying ended disastrously during 1944, which is testimony to the fact that recent changes in minimum altitude regulations for the private pilot cannot be construed to mean that low flying is safe.

Another one out of five liaison accidents occurred during taxiing. The proportion of these accidents to liaison accidents as a whole was far above the same ratio for total AAF flying. In the lightplane, as in many others, it is necessary to "S" while taxiing because of the absence of sufficient forward vision. And safe taxiing requires that speed be held down to walking speed. Riding the brakes has been found to be dangerous practice for brakes need to be conserved for the time they are really needed. That these precautions were not always followed is obvious from the record.

The most frequent type of taxi accident seems to have had little to do with military operation but quite a lot to do with the same kind of congestion and other factors present in civil aviation. Half of all taxiing accidents resulted from bumping into things which should not have been in the way or which should have been seen in time. Pilots and mechanics ran into parked aircraft, runway markers, light standards, trucks, and each other. They came to grief in soft ground, in ditches, and on other irregularities on the airport. Another frequent pair of accident types during taxiing were groundloops and nose-ups, two-thirds of which were the results of gusty winds or prop wash. It seems reasonable to assume that all these conditions may be encountered in the private plane.

Take-off accidents accounted for 11 per cent of liaison accidents and for 16 per cent of the wrecks. The most important factors were engine failure, groundlooping under windy conditions, and attempting to take off from soggy ground. In the L-5, for example, maximum performance take-off run from a hard-surfaced runway is 500 feet with 30 degree flaps. But from a muddy field or soggy turf, or from a loose gravel surface, the take-off run required is 700 feet. The liaison plane did a good deal of short field operation, and the need for multiplying the number of landing fields for private fliers points to the possibility that a good deal of private flying will be done in and out of just such facilities in the future.

Other liaison aircraft accidents occurring in 1944 took place on the ground during engine run-up. Both collisions and nose-ups resulted frequently when the engine was started without chocks, a practice made more hazardous when no one was in the cockpit. Another type of aircraft damage on the ground, not classified as a flying accident, was damage from storms. In one five-month period a total of 73 liaison aircraft were damaged in this way, principally by high winds. The susceptibility of lightplanes to this type of damage is indicated by the fact that while liaison airplanes in the United States at that time accounted for only 4.5 per cent of all AAF aircraft, they accounted for 23 per cent of all aircraft damaged on the ground by wind storms; and over half of all planes completely wrecked by wind were liaison models. The principal factors included: tie-down ropes broke; mooring sticks pulled from ground; mooring equipment was inadequate; chocks blew away; storm warnings were inadequate.

Difficulties in Army lightplane operation were most common in cases where the pilot had little experience. For example, during the period January, 1943, through July, 1945, 38 per cent of all pilots involved in liaison aircraft accidents had less than five hours experience in the model being flown at the time of the accident. Nearly 58 per cent had less than 10 hours, and 74 per cent had less than 15 hours.

Review of liaison aircraft accidents in the Army provides considerable evidence that a large number of accidents could have been avoided easily and that the same types of accidents can be avoided in civil aviation in the future—provided there is a willingness to learn the facts available and correct the most obvious conditions which lead to trouble.

There can be much to gain from digging into the Army's records and adding them to our civil aviation experience. Then we can come up with some answers based on facts. We can predicate designs, instructions, safety education, airport management, maintenance practices and other flying services on every bit of knowledge we can gather from all of our experience. A lot of work, yes, but private flying is potentially an enormous business and licking the accident problem will be its biggest boon.

Most liaison accidents in the United States happened because of conditions that every private flyer is liable to encounter. Not all, but most. All you need is an airplane that invites errors, a pilot who makes them, a poor airport, a violation or two, and some gusty wind. You don't have to join the Army. END

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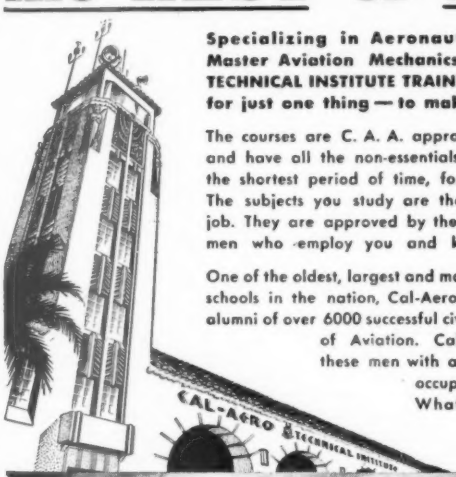

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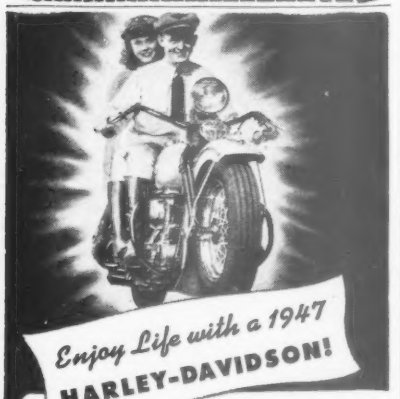

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(*Continued from page 55*)

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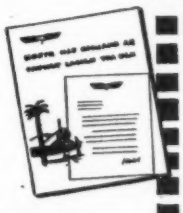

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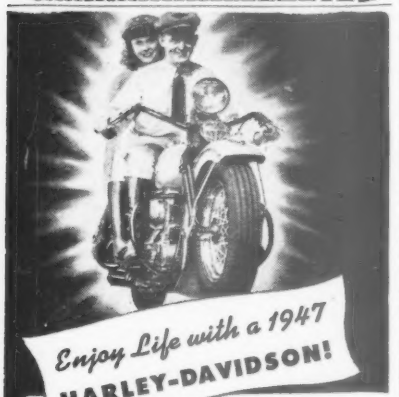

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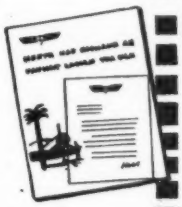

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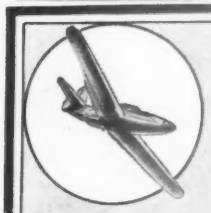
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Letters

(*Continued from page 6*)

sort of an informal investigation into such questions as why a state the size of Michigan should be allotted only 11 planes for its training program and why empty barracks at Romulus can't be used as overnight quarters while we "sweat out" the line. I make this suggestion with all the reserve pilots in mind, not just those in Michigan.

DENNIS F. HALEY
2nd Lieut., AAF (Res)
Lansing, Mich.

GROUND THE GLAMOUR BOY

The article "So You Don't Like My Airport!" (October issue) by George Crockett was a dandy. I'm a flyer who never managed or owned an airport, but it did my heart good to see someone paint a picture of these self-esteemed, glamour-boy pilots. There are a lot of good sensible pilots, but the number of the other kind still in existence turns my stomach.

I'd like to visit George Crockett's airport.

LAWSON E. MILLER
Los Angeles, Calif.

WORLD'S FIRST AIRFIELD

Reference is made to Robert H. Halpin's letter in the September issue of FLYING. Bethany (Conn.) may have the oldest *private* airport in the United States, but the world's first airfield is located on the Patterson Field Reservation near Dayton, Ohio. It was here in 1904-05 that Orville and Wilbur Wright first maneuvered their airplanes in definite flight patterns. On September 20, 1904, they made a complete circular flight.

The world's first airfield then consisted of a level, but rather rough cow pasture of approximately 80 acres. Prior to a flight the cattle were first driven to the southern portion of the pasture, and, taking the prevailing wind into consideration, a site was selected for the catapult from which the airplane was launched. The catapult consisted of a carriage on a monorail track. Take-off was accomplished by the force of a 1,200- to 1,400-pound weight being dropped a distance of 16.5 feet from a wooden tower at the rear of the catapult.

By 1905 the two airplanes used by the Wright Brothers were so developed that on October 5, a flight was made which ended only because of fuel exhaustion. This particular flight over a circular course covered 24.2 miles in 38 min. 3 sec. —approximately 38 m.p.h.

ARTHUR C. SYLVESTER
Chief, CAA Planning Division
Washington, D. C.

'COPTER COLLEGE NOTES

I read with interest Major Sanduski's "'Copter College" (October issue). However, the article contains a few assertions with which I can not agree.

On page 88 the major states: "By the following May ('45) four more helicopters had been delivered and we outgrew Chanute. Again orders came through and we moved in 'the largest mass helicopter cross-country flight' to the training base at Sheppard Field, Tex."

The largest mass helicopter flight? For the major's information, some six months before (on December 7, 1944) the Royal Naval Helicopter School—run in conjunction with the U.S. Coast Guard helicopter school, Floyd Bennett Field—closed and a mass formation of 12 helicopters flew from New York to Norfolk, Va. The 'copters mostly YR4's and a few R4B's, were landed aboard the carrier (CVE) *H.M.S. Thane* for shipment to England. I believe this flight still marks a record for mass-formation movement.

Again, the major states that in the "intermediate stage" the student learns to maintain constant alltitude, direction, etc., and autorotation. If this be true, the AAF must have made up its own training curriculum. The *first lesson* our USCG instructors gave us had to do with straight and level, keeping constant altitude and direction. These skills had to be achieved before the pupil could go on to take-offs and landings or hovering. Next came autorotation. This was as important as checking a pupil out on spins before solo. *Prior to taking his solo flight*, the pupil had to do two autorotations, one without the instructor touching the controls.

The major also says that the quick stop was done at 50 feet at 50 m.p.h., and that this maneuver was taught as a defensive measure against attacking fighters. We did our quick stops at 50 feet, but at normal cruising speed which is about 65 m.p.h. And we were taught that it was a routine emergency stop. We used it on practising co-ordination, as with the 360° hovering turn.

Maybe this explains why I feel that the USCG leads the field in helicopter flying.

D. L. FOLEY
Ex-Lieut. Comdr. (A) RNVR
Dartmouth, N. S.

WRONG PLANE SPECIFIED

I thoroughly enjoyed the fine collection of photographs in "Michigan Air Tour" (October issue) but there was one shot that made my eyes pop out. For the upper left-hand picture (on page 24) your caption states that Howard Hartung is making a minor adjustment on his Beechcraft biplane. Now if that is a Beechcraft strut I'll eat it—pitot tubes and all!

T. M. McDAVITT
Wichita, Kans.

● It looks like FLYING's caption writer will have to eat that Waco strut.—ED.

KEEPING CHARTS UP TO DATE

The criticism of sectional charts by Mr. Whittier and the answer by Mr. Morton (FLYING, August issue) were very interesting. I believe the solution to the problem is simple.

Each airport operator should be sent an up-to-date chart by the Chart Branch and he should make all corrections that he knows about in his area. If this were done semi-annually, prior to printing each new set of charts, there would be fewer cases of pilots having to land on country roads or cow pastures in order to find out where they are.

EDWIN F. WACH
Fort Worth, Tex.

END

Report from Washington

(*Continued from page 42*)

pacific flights, it should be added, are figured in two hops—U.S.-Hawaii and Hawaii-west. Over-water flights are flights during which the plane was more over water than land, as Miami to Brazil. . . . Of the three planes lost, two disappeared—probably shot down by enemy planes or surfaced submarines. The third was deliberately ditched, without loss of a single passenger Any way you figure it, *some* record.

Unification

Speaking of Army, AAF is still for unification. Latest is the result of an exclusive interview by John Lancaster, our New York correspondent, with Lieut. Gen. George E. Stratemeyer. Says General Stratemeyer: "We of the Air Force believe that unification of the Armed Services, which would give our country an autonomous Air Force co-equal with the Army and Navy, would further increase the buying power of the security dollar."

Those pilots not in the AAF should quit worrying about getting lost in the shuffle if such a force were created, the General believes. "The important thing I should like to stress," he said, "is that there is a place for every Navy, Marine, or Coast Guard airman, both rated and non-rated, commissioned and enlisted, in this autonomous air force on an equal basis with Army airmen. Gen. Carl Spaatz, our chief, has indicated to me that a belief that they will be lost in the shuffle is erroneous and we are most anxious to inform the public to this effect." General Stratemeyer also proposed a name for the new outfit—the United States Air Force. He didn't mention how soon he expected it to become a reality. . . .

Whittle's Report

Frank Whittle, an RAF Air Commodore and Britain's jet expert, after his recent tour of the U. S. gave England a not too complimentary report of U. S. jet propulsion progress. He told a reporter from the British aviation magazine *The Aeroplane* that the British had a "two year lead" over U. S. in jet engineering.

He added that it isn't because the American engineers were lacking in information that the U. S. lagged behind, but rather that "the data we had supplied had not been used."

Reporting on jet progress in the U. S., Whittle said that he visited only one firm (McDonnell) which was 100 per cent on jet production and that he thought the British jet work being done at Rolls-Royce was equal to the entire efforts of all U. S. firms put together.

Air Commodore Whittle expressed the hope that in the future British jet aircraft would be entered in air races in this country against U.S.-built craft.

Ice—and Fish

From the West Coast come a couple of yarns which—knowing the reliability of our correspondent—we will vouch for. Most credible is the one about the late Harry Crosby, Northrop's chief test pilot, who was known as "the ice man." He was one of the coolest fliers in the business. He had bailed out several times before he met his death recently in the crash of the XP-79, and once took to his chute after the controls went bad on a wing glider over Muroc Dry Lake. A rescue party rushed to pick him up after he landed, hoping he was uninjured, and found Harry walking around in circles peering at the ground. "Paid $12 for those sunglasses and now here I've gone and lost them," were his first words. . . . Then there is the one about why private pilots like to fly into Boulder City, Nev., airport, up by Boulder Dam, after a rainstorm. It's to see fish, says Littrell, that shouldn't be there at all. "Rather complicated," he adds, "but here's what gives: Dry Lake is right next door to the airport. There's never any water in it until it rains and then, in the muddy puddles, fish are found swimming. They are two or more inches long with a crust of shell over the front part of the body." Seems they live in the dry mud when there's no rain, then become active as the first puddle forms.

Big Engine

We picked up a lot of odd facts about the new XR-7755, world's most powerful reciprocating aircraft engine. It's a Ly-

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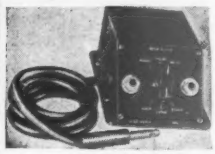

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coming, but if that gets you to comparing it with any other Lycoming you've ever seen, wait till you hear some of the details. It has been abuilding since 1932, but more urgent war jobs held up its completion till this fall, 14 years later. Smaller engines of the same type were built along the way, the XR-7755 not getting into production till the war was nearly over. Complete, it is slightly over 10 feet long and five feet in diameter, yet it produces more power than a steam locomotive 90 feet long and 15 feet high. . . . It burns 580 gallons of gas—enough to power the average automobile for a year—in one hour at maximum speed and power. . . . Cut out of some AAF stories were a couple of technical facts that the censors thought okay to release but which later got lost in the higher echelons. The propeller drive is through a two-speed dual rotation reduction gear, either ratio of which can be used at the pilot's discretion to obtain maximum propeller efficiency. The shifting is accomplished hydraulically. Another feature is the use of two separate sets of cams which can be shifted to change the valve timing for maximum power or cruising economy.

Lab

Almost as remarkable as the engine is the laboratory that Lycoming, aided by AAF's Air Material Command, built to test it. The lab has, among other things, nine dynamometer rooms, five test stands, and almost every conceivable piece of equipment necessary to test a reciprocal engine of any size. Completion of the big engine, and final testing, had to be held up until the laboratory was completed. The engine was ready for testing in July of 1946. Lycoming may go on to an even bigger one if the laboratory's capacities are any indication. "Facilities are now available," their engineers announce, "for the testing of engines from 65 hp. up to engines in excess of 7,000 h.p."

Weather

Commercial broadcast stations and networks are carrying weather reports for tne private pilot under the supervision of the Weather Bureau and as this goes to press the program is working out fine. It's being tested first in the middle west and Rocky Mountain areas, according to Dr. F. W. Reichelderfer, Weather Bureau chief, but will become nation-wide as demands justify. Current reports are going out from stations in Madison, Wis., Chicago, Wichita, Ft. Worth, and Salt Lake City. They supplement weather information broadcast over CAA airway range stations, until recently monopolizing such broadcasts. The new programs are handled by weather bureau personnel in the towns in question and a complete schedule is available from the Weather Bureau's national headquarters, Washington, D. C. . . . Chief reason for the programs is Dr. Reichelderfer's belief that increased private flying will bring a corresponding increase in the demand for more weather information. Weather Bureau experts foresee the day when pilot demands will reach such a volume that special weather broadcasting stations will be required. END

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of Flying, Published Monthly at Chicago, Ill., for Oct. 1, 1946.

State of Illinois, } ss.
County of Cook }

Before me, a notary public in and for the State and county aforesaid, personally appeared A. T. Pullen, who, having been duly sworn according to law, deposes and says that he is the Business Manager of Flying and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, W. B. Ziff, 185 N. Wabash Ave., Chicago 1, Ill.; Editor, Max Karant, 185 N. Wabash Ave., Chicago 1, Ill.; Managing Editor, Curtis Fuller, 185 N. Wabash Ave., Chicago 1, Ill.; Business Manager A. T. Pullen, 185 N. Wabash Ave., Chicago 1, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

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3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is ..... (This information is required from daily publications only.)

ARTHUR T. PULLEN,
Business Manager.

Sworn to and subscribed before me this 30th day of September, 1946.

[SEAL] DORIS PALOWSKY,
Notary Public.

(My commission expires April 25, 1949.)

License Fever

(*Continued from page* 18)

has come out strongly for standard state laws, leaving licensing in Federal hands, working out regulation by co-operative efforts among state and Federal officials. There is not a national organization in the country interested in promoting private flying that isn't opposed in principle to state licensing laws, old or new.

But that is not enough. Each state has its own peculiar political set up, its own special set of laws governing aviation, or—if without law currently—its own special clique of politicos who would like to vote themselves or their followers fat jobs by making licensing and registration revenue legal.

There is a way to stop such practices, once and for all, and local organizations can be of great assistance to national organizations, such as AOPA, in doing so. The way is clear—every person interested in private flying should make it his business to discover the situation in his own state and act accordingly.

This is not as difficult as it may sound. Most state aviation commissions will be co-operative and will welcome support. In states without commissions, all you have to do is get in touch with your legislative representatives and let them know what will be best in aviation, not only for private flyers, but for the welfare and progress of the state as a whole.

Above all—*act now*. The year 1947 can well mark the day when the airplane becomes a national vehicle of progress. But if complicated licensing or registry regulations go on the books, it can be a year notable only for the sorry fact that it saddles private flying with endless bureaucratic gobbletygoop. END

London Letter

(*Continued from page* 51)

most assuredly will come into favor in the very near future.

Objections usually center round the difficulty of disciplining air passengers. It is argued that in an emergency they would not be able to use parachutes because of panic. Experience with airborne forces is quoted in support.

It seems to your correspondent that the answer lies in the proportion of time the passenger aircraft spends flying high. Only in proportion to the time spent in flight, are chair parachutes worth installing.

Lightplane Dilemma

Chief complaints of the very few British owners of lightplanes are that gasoline often is not available over here; that landing fees are too high; that the customs authorities do all they can to hamper the ordinary air tourist.

Repeatedly the newspapers have suggested that gasoline was to come off the ration and to be available to all who had the price to pay for it. But coupons are still necessary. And Mr. Shinwell, Britain's Minister for Fuel and Power, has announced that restrictions must continue.

Meanwhile in France and Belgium the air tourist can get all the gasoline he needs for a low-powered aircraft. This is one reason air tourists are deserting Britain for the Continent.

And as for landing fees, a small aircraft pays sixpence (20 cents at a French airfield while in England it paid seven-shillings-and-six pence ($1.80) or ten shillings ($2)—though these rates are now to be reduced to five shillings ($1).

Radar Aids

The airfields at Heathrow (London Airport,) Northolt, Hurn, Croydon, Prestwick, Bristol and Aldermaston have equipment for enabling landings to be made in poor visibility. But no airport in Britain (or probably in the world) is using to the full the traffic control advantages offered by radar.

Infuriated air travelers are asking why. At first, having read of the wonders of radar in their newspapers, they fumed when in bad weather their aircraft were stacked for a long time or diverted. They got even angrier when, as on a recent air journey to the Channel Islands from London, the aircraft found the small terminal airport closed down by fog and had to return to London without landing.

The fact is that in Britain we must expect several months to elapse before these aids are installed at the main airports. Publicity for radar has gone ahead of practical application. END

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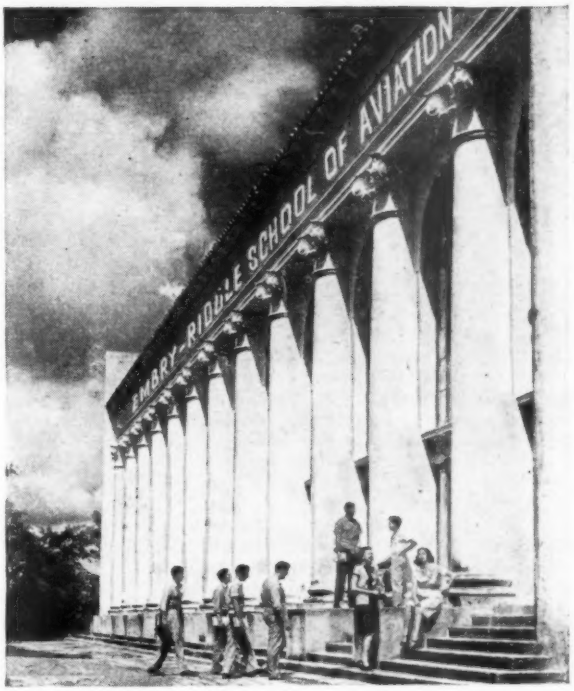

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Marine Air Reserve

(*Continued from page 31*)

ranks of wartime marine pilots and radar men.

With headquarters at the Glenview Naval Air Station near Chicago, General Schilt directs the entire program under the command of the Commandant of the Marine Corps. The general—a Medal of Honor winner from Olney, Ill., who enlisted in the Marines in 1917—emphasizes the fact that his program is not designed simply to furnish a body of trained Marine reserve aviators for the rapid emergency expansion of the regular establishment. Instead, the primary mission is the training and equipping of 24 war-strength fighter-bombing squadrons and four warning and fighter director units, all trained and ready to join the active service when needed.

These units meet for training on alternate weekends, according to the convenience of their members. In addition they spend two weeks in full active duty, for a total training time of two months per year. As members of the organized Marine Corps Reserve, all hands receive active-duty pay for the full training period, and pilots are allowed a total of 100 flying hours a year. The units so trained must be ready for active service as self-contained, autonomous units on 10 days notice.

Since peacetime strength of regular Marine Aviation is set at 21 squadrons, the MART program will more than double the squadron strength of the Corps in time of war or emergency. The total figure of 1,086 pilots in the organized reserve does not, however, indicate the number of qualified reserve aviators available for duty. In the volunteer reserve are some 7,000 pilots who cannot afford time for regular drill periods. These now are given the opportunity to fly when they can. In time of trouble they can be brought quickly up to a state of readiness to reinforce the immediately available regular and ready reserve units.

Each of the reserve squadrons comprises 45 pilots, 12 aviation ground officers, and 164 enlisted men. Ground Control Intercept outfits have nine officers and 120 enlisted men per squadron. The link with the regular Marine Corps is affected by the Marine Aviation Detachment Commander, who is a regular officer. With two officers and some 15 enlisted men —all regulars or reserves on the continuous active duty which the program allows —he handles the administrative and maintenance problems of the squadrons during the week. Normally detachment commanders act as "inspector-instructors" for the squadrons based at the 21 reserve stations. They are charged with keeping the reserve up to date on all new developments in military aviation relating to fighter-bomber tactics.

The detachment commanders work as closely as possible with the squadron commanders, although all the details of training and administration are left to the reserve officers in command. General Schilt has seen to it that his inspector-instructors are hand-picked. At Glenview, for instance, Marine Fighter Squadron 121 (the high scoring Marine squadron of the war with 209 Jap planes to its credit) is commanded by Maj. Robert S. Ingraham, who is a Chicago insurance salesman during the week. The detachment commander is Lieut. Col. Leonard K. "Duke" Davis, who led Squadron 121 into Guadalcanal in 1942. That was the time Joe Foss racked up his phenomenally high score of Jap kills.

All the 24 squadrons allotted to the organized reserve represent a distinguished cross section of the Leatherneck fighters and dive bomber squadrons which fought the war from Wake to Okinawa. Chicago's 121 leads the Corps in numbers of Nips shot down, but the records of the other 20 *Corsair* squadrons which have been flying in the Reserve since July are also impressive.

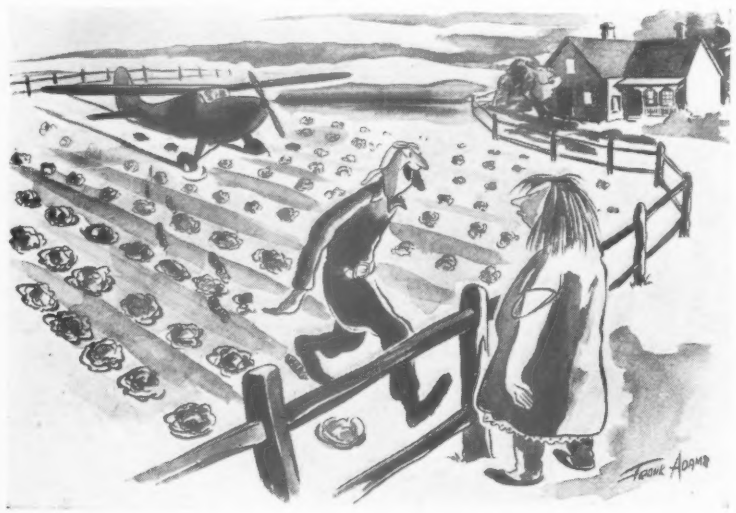
The training syllabus of the Organized Reserve requires pilot proficiency in both fighting and ground-support categories. The designation "fighter-bombers" means just that. The 24 squadrons must be capable of performing both the "combat air patrol" missions and the beach strafing and bombing missions necessary to give the amphibious elements of the Marine Corps maximum support in their beachhead jobs. Each squadron must be trained for carriers—and that calls for field carrier landing practice, the familiar "bounce drill." It is expected that the two-week continuous active duty tour allowed annually for the reserve will include carrier qualification for all squadron members. "Flat-Hatting" is out although there will be extensive training in dive bombing, ground strafing, and rocket runs. All planes of the reserve are painted with large yellow stripes and numbers which permit their easy identification from the ground.

The *Corsairs* allotted to the 24 squadrons are mostly later models than those which did the jobs at Iwo and Okinawa. Policy of aircraft procurement for Schilt's outfits provides for the same aircraft as used aboard the carriers in the active fleet. Pilots and ground personnel will be trained to fly and service new aircraft as they are adopted.

Largely because of two factors—the fact that officers, unlike enlisted men are not discharged from the reserve on demobilization and the fact that the reserve cannot accept personnel eligible for selective service—the ready reserve has more officer applicants than it can accommodate and too few enlisted applicants. Personnel officers in General Schilt's headquarters anticipate an easing of this situation when selective service personnel are eligible for enlistments in the reserve. They count heavily on the fact that the squadron personnel will have to be skilled in every job required to keep a fighter-bomber squadron in wartime operation. The 164 enlisted billets include all of these jobs, and as men enlist they will be trained by the permanent personnel at the air stations. Such training will, wherever possible, be conducted with the aim of qualifying the trainee for CAA rating in his field.

Although restricted now by the Selective Service Law, enlistments in Marine Air Reserve Training units are open to all veterans—whether Army, Navy, or Marine. Personnel officers at Glenview are surprised at the numbers of ex-members of the other services who are enlisting in the reserve. All personnel assume the corresponding marine rank to that they held at the time of their discharge from the Army, Navy, or Coast Guard.

The 10 understrength squadrons of the pre-1940 Marine Aviation Reserve furnished some 240 trained pilots at the time of reserve mobilization in 1940. Today General Schilt's command, with a tradition second to none, will furnish the Marine Corps and the country with 24 full-strength fighter-bomber units on 10 days notice whenever they are needed. They are the Organized Reserve and the Corps counts them into its mobilization plan with pride and confidence. END



FLYING

"Mrs. Wiggs, I presume!"

I Learned About...

(*Continued from page 56*)

doping, and doing the million-odd other things that have to be done to get a plane ready to pass the x-ray eye of the CAA inspector. This was really learning the hard way, but I was grateful that I had come out of the wreckage intact and that the plane could be repaired.

During the rare moments when I am not busily and vigorously kicking myself in the seat of the pants, I have firmly resolved never again to try a take-off from a rough, short field or even a rough, long field. Next time I'll push the plane five miles if necessary to get to a smooth runway. I'll even take the wings off and tow it to an airport. But never again will I have a cracked-up airplane because of a bonehead "let's-get-home-in-a-hurry" take-off from a bad field. That's a resolution I intend to keep.

Incidentally, the day after this crackup occurred, I read that every year hundreds of planes are brought down safely with little or no damage in forced landings, but that a large number of them are wrecked in attempted take-offs from unsuitable fields. To that statement may I offer a fervent amen. I learned about flying from that. END

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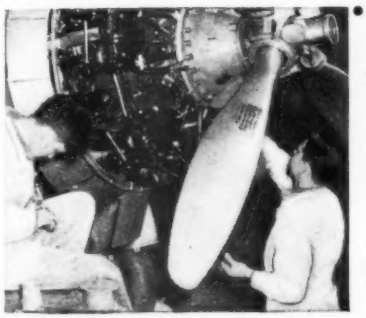

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Index to FLYING—1946

Compiled by WILLARD KELSO DENNIS

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SUBJECT INDEX

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TWO 1946 Ercoupes: NC2733-H brand new, only factory fly away time; NC93908 87 hrs. Both planes hangared liquidating interest in Ercoupe dealership, changing residence making possible this unusual offer. Both planes $6000 strictly cash. Will deliver for expenses. Ten% binder will hold wire. H. N. Carrier, 706 Goodall, Daytona Beach, Fla.

ERCOUPE, mfg., July 29th, 1946. 75 hrs. since new, starter, generator, Nav. lights, etc. Only $2850. John Ostrander, Gowanda Airport, Gowanda, N. Y. Phone 910F5.

ERCOUPE 1946, deluxe 75 hp. Model 415C. Less than 25 hours since brand new. Starter, generator, battery and navigation lights, green sun shade, sensitive altimeter, T&B, RofC, suction gauge, and radio with fixed antenna. Never damaged, reason for selling, have purchased twin engine ship. Price $3500. Wire or write. Clyde Sturgell, Jr., P. O. Box 46, Tuscola, Ill. Phone evenings 7121, Arcola, Ill.

ERCOUPE, 415C, 1946, NC99850 series, manufactured July 1946; only seven hours total time, brand new condition. Starter, generator, lights. Am taking delivery on larger plane; for quick sale only $3200. Bellemor Interests, 121 Sussex Ave., Newark, N. J.

1946 ERCOUPES latest models. 28 hrs. on one price, $3300. 35 hrs. on other price, $3200. Guaranteed like new. Phone or wire. Ray Browning, Grimes Field, Urbana, Ohio.

ERCOUPE, new, 70 hrs. total time; never damaged. Homer Grismore, Corydon, Iowa.

1946 ERCOUPE, perfect, 85 hrs. total time. Just had 100 hr. check. Starter, new type gear, new type trim tab, etc. Delivery anywhere in U. S. for expenses, $3350. Write R. J. Southey, Burlington, Wis. Phone 344.

1946 ERCOUPE 75 hp, never cracked, only 66 hours total time. New 2-way 12 watt transceiver with speaker and phones. Deluxe equipment, airplane like new, only $3300. Harold Paulson, % The Vindicator, Youngstown, Ohio.

ERCOUPE, NC99939, July 1946, 30 hours total. Has starter, sensitive altimeter, cost $3600.00. Perfect new condition. $2900.00 flyaway. W. H. Forse, Anderson, Indiana.

ERCOUPE, latest 1946 model with starter. No time, new. $3350. Ted Boston, Marion, Ky.

ERCOUPE 1946. Model 415C. 50 hrs. total time. Starter, generator, battery, navigation lights, 2-way Airado radio. Always hangared, never cracked, privately owned. Can be seen at Carleton-Whitney Aero Service, Wilkins Airport, North Attleboro, Mass. $3200. Frank Ryder, Walter E. Haywood Co., Attleboro, Mass.

HUNDRED hours, '46 Ercoupe. $3300. R. R. Halstead, Beach, N. D.

FAIRCHILD

PT-19 LICENSED and flying now. Will need engine major and recover soon. Fly it away $500. Salina Flying Service, Sky Village Airport, Salina, Kansas.

FAIRCHILD 24, 175 hp Ranger. Built 1940. Four place. Less than 500 hrs. total time on aircraft and engine. 65 hrs. since both majored. Just relicensed. Hand rubbed finish. Blind flight group. Clock. Lear receiver and transmitter. New tires. New enclosures. An exceptional buy. Price $4850. The Coogan Co., 8440 Sunset Blvd., Hollywood 46, Calif.

PT-19, GOOD condition, trim perfect, handles like a baby, 560 hrs., engine since major, 62 hrs. since licensed NC 54298. Am getting new ship must sell, $785.00. M. E. Pope, 1512 W. Park, Oklahoma City 6, Okla.

PT-19A, aluminum finish. 1175 hrs. for plane, engine new with 150 hrs. Annual license renewed in September; new exhausts and plugs. Tie down kit; tarpaulin cover for cockpits. Keep in mind if buying plane next spring. J. L. Chapman, Belgrove Rd., Baltimore 28, Md.

FAIRCHILD 24, Model C8C, just relicensed; blind flying group, 2-way radio, landing lights, starter, generator, wheel pants, hand-rubbed finish; recovered and reupholstered Nov. 1945; a bargain at $3250. Lake Charles Aviation Service, Lake Charles, La.

FAIRCHILD PT-19, just relicensed, perfect condition, newly majored engine, $1250. Lake Charles Aviation Service, Lake Charles, La.

PT-26—200 hp, completely equipped for night and instrument flying. Both cockpits have full panel groups, with moveable hood in rear. Full cockpit canopy. Electrical starting system. Only 345 hrs. since first majored. Just newly painted and licensed for night and day. Price, $3000. Geo. H. Paquette, 603 Baldwin, Detroit 14, Mich.

FAIRCHILD PT-19 just licensed, very good condition. $1295. Arkansas Aviation Service, Grider Field, Pine Bluff, Ark.

PT 26 FAIRCHILD, Fleet built Canadian trainers, now being licensed for day and night. 200 hp Ranger, with 195 hrs. since new. Wings fabric covered over wood. Plexiglas cockpit enclosure, cabin heat. Landing flaps, landing lights, electric starter and generator. Full set instruments, blind flight group both cockpits. Beautiful hand-rubbed white with green trim finish, chromium plated hub caps. 100 MPH cruising. Two of them at $2250 each. Picture mailed upon request. Billy McCain Motor Co., 1207 Cerrilos Rd., Santa Fe, New Mexico.

FAIRCHILD PT-23 to trade for Luscombe. 50 hrs. since major, new engine, prop, tires, and fabric on wings and center section. Perfect condition, fully licensed with new engine mounts. Richard C. Scal, Cary Hall, Purdue, W. Lafayette, Ind.

ONE PT-23 aeroplane. Excellent condition. Licensed. Total engine hours 130. 22 hours since major. 140 total hours on air frame. Insured. Write Norman W. Steury, 904 Walnut St., Decatur, Indiana.

PT-23. Total hours aircraft and engine 43. T/B, Elect. intercom., headphone, mic., 2 new goggles. Leatherette cushions. Two $150.00 Pioneer back pack chutes, new. Instruments both cockpits. 15 coats white dope, maroon tapered leading edge. Hand rubbed and waxed. Never cracked. Licensed Sept. 1946. $2975.00 Dr. J. M. Creagh, 269 N. Fulton St., Fresno 3, Calif.

24G NC 19172 licensed four place. Warner 145 spline shaft, new type heads, new prop. Approx. 80 hours since complete motor major, recovered 1943. Just refinished, orange wings, blue fuselage. RCA transmitter and receiver, turn and bank, rate of climb. Thermocouple, etc., mohair upholstering, zippered, inspection holes, 1938 model flaps. All equipment in perfect working condition. Price $5400. Ralph L. Hughes, Santa Maria, Calif.

M62A. Manufactured 1944. Seventy hours total aircraft and engine. Blue and yellow. New condition. Relicensed August, 1946. $2000.00. W. D. Meyer, 333 High St., Portsmouth, Va.

PT-19A Fairchild. Just relicensed. Engine has 550 hours since new. $1650.00. Free delivery in Montana. Ronald Upham, Loma, Montana.

LUSCOMBE

1946 LUSCOMBE Silvaire, private ship, only 63 hrs., fresh from 100 hr. check. $2885. Tom Cregan, New Paltz, N. Y.

LUSCOMBE seaplane. New June 1946. Special paint job. Has just had first 100 hr. check. Privately owned. $3950. W. Huntington, St. James, L. I., N. Y.

1941 LUSCOMBE, Model 8B, Ly 65, total time 599 hrs., 113 hours since major, T&B, RofC, sens. alt., clock, Air Assoc. radio Model BR3, cabin heater, ship always hangared, privately owned, in A-1 shape, price $2500. Write or phone H. L. Horton, Western Springs, Ill. Phone W S 873.

LUSCOMBE 8A's 1946 Models, your choice of five $2000 to $2500. All ships low time and A-1 condition. Salina Flying Service, Sky Village Airport, Salina, Kan.

GENERAL SKYFARER

1941 SKYFARER (NC 41801), Model G1-80, Lycoming 75 HP. Fabric good, new paint (red & yellow), carburetor and cabin heaters, new windshield and door glass, hydraulic brakes and shock absorbers. Tricycle landing gear. No hours since 100 hour check. Total hours on ship and engine 210. Sacrifice—price $1885.00. Can be seen Compton Airport, Compton, Calif. Contact R. H. Livernash, 11086 Holme Ave., Lynwood, Calif. Phone Ne 62739.

HOWARD

HOWARD DGA15P. 450 HP Wasp. Built 1943. Five place. 460 hours total time since new. Licensed June, 1946. Day and night instrument flight. Hamilton Constant Speed Propeller, Spinner. 6 hours cruising. Airline radio equipment. Three receivers. Two transmitters. Directional loop. Marker beacon receiver. Complete blind flight instruments. Landing and navigation lights. Flares. New custom interior, new 40 coat hand rubbed finish in dove grey, cardinal red trim, insignia blue outline. Ship like brand new. Price $10,500. The Coogan Company, 8440 Sunset Blvd., Hollywood 46, California.

INTERSTATE

INTERSTATE S1-B1. Recovered and refinished with 14-coat DeLuxe dope job. Leather upholstery, Grade A fabric, 2-way Lear radio, full primary instrument panel, starter and generator. $2250. Brownair, Inc., Orange, Tex.

INTERSTATE L6 1943 (year built). 300 total hrs. 20 hrs. since overhaul and license. Red and blue finish. Very clean. Can be seen at airport at Hallstead, Pa. Price $2100. Kenneth N. Cobb, Hallstead, Pa.

LOCKHEED

VENTURA, twin engine P&W, R-2800-31; 2000 hp. Less than 75 hrs. on engines since major. Total time on aircraft 625 hrs. Cruises 210. Wire or write Clyde Sturgell, Jr., P. O. Box 46, Tuscola, Ill. Phone evenings 7121 Arcola, Ill.

NOORDUYN

NOORDUYN Norsman. No time since license and recovering. 156 hrs. on engine since new, 1240 hrs. on airframe. Owner recently accepted position on major airline. Priced to sell $8750. Melville H. Hoar, 9001 S. Cicero, Chicago, Ill. Phone Oaklawn 2234.

NORSEMAN NC-59776. Total hours engine and aircraft 179:50; 41:50 hours since last inspection. Full radio equipment, new airline chairs, seat belts, flares and upholstering. Has had best care. Topnotch condition. Address inquiries Cravens, Dargan & Company, P.O. Box 1660, Houston 1, Texas.

TWO excellent licensed Noorduyn Norsemen with spare Wasp engine. Will sell either airplane or spare engine. William Serhus, 1644 21st N.W., Washington, D. C.

NORTH AMERICAN

NORTH AMERICAN, AT-6s. Handpicked. Ready for license. Ferried anywhere for expense. Only $1250. Ed Hoadley, Bloomington, Ind.

3 PLACE SNJ-3 196 hours since major on aircraft and engine, new day, nite, instrument airworthiness. Priced to sell. Hofer's Flying Service, Camden, S. C.

AT-6, PERSONAL airplane. A-DF178 gallon gas tanks. Low time. Worth looking at before you buy. $2795. Has camera mount and doors. Never again so much for so little. A. Hruska, 117 N. 7th St., St. Louis, Mo.

SNJ-3, NC 66238, excellent tires, clear hatch, very clean inside, 3105 crystal radio, approved position lights, all bulletins. Chrome silver high luster finished metallic blue trim, cabin heater. 706 total engine hours, 240 since major overhaul. New night instruments airworthiness. $2150. Hoffer's Flying Service, Camden, South Carolina.

UNLICENSED SNJ-4. Bulletin complied, 684 airplane hours, 121 since overhaul, 452 total engine hours, 130 since overhaul. $1250. Hoffer's Flying Service, Camden, South Carolina.

SNJ-3 LICENSED to August, 1947. Radio converted. Practically new tires with extra set and new tailwheel tire. Licensed day instrument, covers for engine and hatch, B.F. Hood. Inside clean as new. Engine and airframe time since major 135 hours. Corporate owned since licensed. Flown by one pilot only. Absolutely one of best surplus AT 6's. Cost over $600.00 to convert. Best offer over $2175.00. Box 1538, Richmond, Va.

PIPER

PIPER J3 1946. 250 hrs. since new. $1775. John Ostrander, Gowanda Airport, Gowanda, N. Y. Phone 910F5.

1945 PIPER Cub J3 C65. 330 hrs. plane and engine. Licensed $1950. Bachmann, Magnolia, Mass.

E2 CUB A40A. Total time 1085, motor major 110 hours back. Wings need recover. Flyable, $400. Anderson, 1138 Cloverfield, Pittsburgh 79, Pa.

1938 CUB J3 C 40. 35 hours since major. Needs little work. $500.00. M. Guerrini, 2 Rutgers St., Maplewood, N. J.

PIPER Cub J3: 50 hrs. since top, Lycoming 65. New lifetime windshield. New side windows, new control cables, new steerable tail wheel. Fabric good. Ship just relicensed. $1595. Ferry up to 200 miles. Valley Flying Service, Salem Municipal Airport, Salem, Ore. Phone Salem 3023.

CUB coupe J4F 1940 Lycoming 65. Relicensed, good condition, well cared for, 2 props, lights, aerial, pants, $1700. Vandenbroek, 1128 Birk, Ann Arbor, Mich.

PIPER Cub J3 only 56 hrs. since Major. $1400. Inquire Crawford Flying Service, Berlin, Wis. Phone 117 WX.

PIPER Cub J3F65—400 hours before next major. Excellent condition. Privately owned. $1300. L. D. Sprague, Corning, N. Y.

PIPER Cub coupe with 65 hp. Continental engine. 75 hrs. since overhaul. Fabric one year old. Just relicensed. $1595. Arkansas Aviation Service, Grider Field, Pine Bluff, Ark.

CUB, J-2, excellent condition, fuselage recovered '45, wings in '46, motor majored, relicensed July 4. $795. Donald Jones, Weirton Airport, Weirton, W. Va. Phone 72-J.

1941 75 hp CUB coupe, J4E, starter, generator, receiver, navigation lights, new battery, relicensed, perfect condition, $1650. Lake Charles Aviation Service, Lake Charles, La.

PIPER seaplane J-3L-55, landing gear included, licensed, just recovered, 20 hrs. since periodic check, ½ qt. oil/5 hrs., 4 gal gas/hour, winter on wheels and summer on floats! A. E. Rich, 124 Emerson Rd., Longmeadow, Mass. Tel. Spfld. 4-4376.

CUB Cruiser J-5 late 1940 Model. Good performance with 3 people. Only 30 hrs. since major and always hangared. Price $1975.00. Kerrville Flying Service, Kerrville, Tex.

PIPER J5B Cruiser, majored engine, ship licensed and ready to go. $1500. Salina Flying Service, Sky Village Airport, Salina, Kansas.

J-3F65, NC 40950, clean throughout, 100 hours since majored. $1195. Beaty Air Sales, Independence, Iowa.

THREE Cubs, $900 up, very clean. Stillwater Flying Service, Stillwater, Okla.

CRUISER J5A, C75. Just refinished & licensed, 50 hrs. on engine since majored with all new parts except carb. & mags. New prop. All new glass. Excellent condition, $2000. Eugene Paules, R.D. 3, York, Pa. Phone 7196.

PIPER Coupe J4A-C65. Relicensed; navigation lights; 154 hrs. since majored & recovered in 1944. 12 coats dope; hand-rubbed finish. Kept well waxed. Two-way radio loop & training antenna. All new glass being installed. $2250. Will pay to ferry anywhere in U.S.A. Frank Almeida, 3030 N.W. 3rd St., Miami 35, Fla.

PORTERFIELD

PORTERFIELD L65 1940. Plane & engine majored. Relicensed Oct. 1946. Oscar Curtis, Whitman, Neb.

THREE Porterfields, excellent condition, low time, all relicensed; priced as low as $1250. Stillwater Flying Service, Stillwater, Okla.

REARWIN

REARWIN Cloudster, Instrument Trainer 8135T, 120 Ken-Royce. Built 1942. Low Time. 22 hours since overhaul. Gyro horizon, directional gyro, and all other flight and engine instruments. Generator. Trail and fixed antennae. Newly finished. Maintained by Pan American Airways. Cruises 120. Inexpensive to operate. Just the instrument trainer for a G. I. Program. Price $2,950. The Coogan Company, 8440 Sunset Blvd., Hollywood 46, Calif.

RYAN

RYAN ST 3KR, only 20 hrs. on engine, aircraft and propeller since complete overhaul, absolutely perfect. Wish to make trade on Luscombe, Ercoupe, Cessna, Culver, or will take reasonable cash offer. Mr. A. Patton, P.O. Box 132, Morganton, N. C.

RYAN PT-22. Only 25 hrs. since engine majored. Airworthiness certificate received Oct. 16. All bulletins complied with. Canvas cockpit cover. Silver and blue. Price $1600. Charlotte Sprunt, Box 960, Wilmington, N. C.

PT-22, 160 HP Kinner, 370 hours since major. Radio equipped. Good rubber. Cruise, actual 110 MPH. Nicest Ryan around Detroit. Big sacrifice for quick sale. 3952 St. Clair, Detroit, Mich. Phone Murray 4206.

STEARMAN

STEARMAN PT-17, Continental 220. NC-51807, 182 hrs. on engine since major. Excellent condition throughout. Licensed Aug. 1946. Priced for quick sale, $1350. Airplane being sold to make room for new ships. Daniel Webster Airways, Inc., R.F.D. 1, Nashua, N. H. Tel. Nashua 1080.

STEARMAN PT-13. Licensed NC52750. Beautiful maroon and cream. Price $1395. Air Progress, Inc., Wilmington, N. C.

STEARMAN: N2S-4. Only 1100 hrs. on plane and 150 since major overhaul. Just relicensed and repainted silver and yellow. Built in 1943 and in excellent condition. Full set of maps included, and other extras. Contact Walton E. Fulp, N.A.S.-VRF-1, Norfolk, Va.

BEST offer over $1000 buys clean, licensed Stearman; steel prop; A-1 fabric and airframe; engine 360 hrs. SOH and running perfectly. Joe Alexander, Montezuma, Iowa.

PT-13, low time, very clean, $1450. Stillwater Flying Service, Stillwater, Okla.

STEARMAN, N2S3. Just licensed. New fabric, hand-rubbed finish. Yellow with blue trim. 350 hrs. since major. Price $1395. W. C. King Co., Municipal Airport, Iola, Kan.

STEARMANS: 65 hrs. since engine major, cream and blue; licensed Aug. $1350. 300 hrs. since engine major, just redoped red and black, ready for license. $1200. 600 hrs. since engine major, total 1200, plenty compression, black and orange, licensed. $925. M. Blatnick, R.D. No. 3, Mesquite, Tex.

PT-17. Engine, plane, like new. Nearly new wings, elevators, ailerons, gas tank, cables. $1400. W. E. Ashmore, Maynard, Minn.

PT-17. Only 168 hours since engine overhaul. Just relicensed and refinished in red dope and silver. New wood propeller and hub. Spars inspected. Believe it to be cleanest Stearman in country. Price $1,450.00. Coogan Company, 8440 Sunset Blvd., Hollywood 46, Calif.

STEARMAN PT-17, 800 hours total, just relicensed, perfect condition, $1250. Lake Charles Aviation Service, Lake Charles, La.

STINSON

STINSON Reliant—SR9C: 970 hrs. total time, 136 hrs. since factory major, Lycoming R-680-D5, 260 hp. Grey fuselage, maroon wings and trim. 32 coat hand-rubbed finish. Complete blind flying group plus gyro horizon, directional gyro, sensitive altimeter, radio compass, 3 band receiver, 2-way transmitter. Other extras such as flares, landing lights, custom upholstery, 41 gal. tanks, trailing antenna. Licensed 5 place day or night. Excellent ship in excellent shape for executive or charter. Best offer over $9500. Southern Tier Sales Corp., 311-319 State St., Elmira, N. Y. Phone 5228.

STINSON, 1935 model SRJR (Special), cleanest 4 place in the country. NC13831. 215 hp. Lycoming. Approx. 150:00 since major overhaul airplane and engine. Relicensed Aug. 1946. Red hand-rubbed finish with new genuine leather upholstery. Outside luggage door. New tires, wheel pants, flares, primary instrument group. Retractable landing light, starter, and generator. Navigation lights, Hamilton standard prop. Has to be seen and flown to be appreciated. Call or write. Fred Kingdon or Howard Webb, Twin City Airways, Municipal Airport, Texarkana, Ark. Phone 1500. Price $3900.

STINSON Voyager 150, NC97422. 1946, perfect condition, never cracked. 65 hrs. total time, aircraft and engine. GE receiver and transmitter, landing lights, etc. Owner buying larger ship. First offer $5500. Wire, phone, or write. Connecticut Valley Air Service, Whitefield, N. H.

STINSON Reliant, Lycoming 245 hp no time since major. Hamilton controllable just overhauled. Aircraft refinished and rebuilt. Licensed for night flying. Priced to sell at once. Luscombe 8A 1940, 65 hp Cont., low hours, in extra good condition. Price $1950. Mt. Vernon Flying Service, Box 709, Mt. Vernon, Ohio. Or phone Randy Pribble 731R.

STINSON Reliant V-77, 5 place, 300 H.P Lycoming. Licensed, Red Leather upholstered seat, Full set of Instruments, Two Constant Speed propellers. Total time on A. & E. since new 50 hrs. An excellent buy for $5995, or am interested in trade on Cessna Airmaster or similar airplane Eugene Paules, R.D. 3, York, Pa. Phone 7196.

STINSON 105. Stinson factory maintained. 100 hour inspection just completed. New blue paint job. New tires Fibre glass sound-proofing. Genuine Red leather upholstered seats and trim. $2150 New bladed Beech-Robey controllable propeller optional, $300.00 installed. Dr Don Campbell; 17136 Chapel, Detroit 19, Michigan.

TAYLORCRAFT

TAYLORCRAFT BL-50 1940 Lycoming, side-by-side, two doors, new prop, good cabin heater. Relicensed July 1946. Good clean ship throughout, always hangared, red and yellow. $1400. Ray Book, 1308 5th Ave., Sterling, Ill.

TAYLORCRAFT trainer DC model, just had annual, $1575. Stearman PT-17, licensed, good engine, $750. Aeronca Champion, 187 hrs. since new, $2000. Watonga Flying Service, Watonga, Okla.

TAYLORCRAFT "Ace" 1946 NC44134, $1950. Cont. 65, 50 hrs. total plane and engine. Guaranteed like new. Unscratched in any way. Coshocton Airport, Coshocton, Ohio. Phone 333.

TAYLORCRAFT BC12D, 1946. NC96495. Total time 40 hr. Blue and silver. 18 gal. gas. Oscar Curtis, Whitman, Neb.

1946 TAYLORCRAFT BC12D. Only 18 hrs. Always hangared. No accidents. Blue and silver. Cost $2800. New in May. Owner selling because of sickness. Will sacrifice for $2150. First $100 deposit will bold. Louis H. Houillon, 5539 Meryton Lane, Cincinnati, Ohio.

TAYLORCRAFT DCO 65. 650 hrs., 30 since major on engine. Licensed until July 1947. One piece windshield, an honest airplane, $1000. Evergreen Airport, Warren, Ill. Warren M. Hicka, Mgr.

THREE BL-55, side-by-side Taylorcrafts, relicensed, two recovered, all in good condition. We need room, will sacrifice at $995.00, $1375.00 and $1395.00. Springfield Airport, Springfield, Ill.

1939 TAYLORCRAFT BL50, Lycoming 50 hp. Black and red. Good fabric. 40 hr. since licensed. Radio receiver, wheel pants, & skis, $1300. Clifford E. Dennis, Grafton, Ohio. R.R. No. 2.

TAYLORCRAFT side-by-side BC-12, Lyc. Recovered June, '46, with Grade A fabric. Color, insignia red. 10 hours since major on engine. Exceptionally clean. $1900. Brownair, Inc., Orange, Texas.

TAYLORCRAFT, DCO-65. 385 hours total time on engine. No time since 100 hour check. Fuselage recovered, entire aeroplane refinished in green with yellow trim July, '46. $1300. Brownair, Inc., Orange, Texas.

TIMM

TIMM Trainer—N2T1—450 hrs. total—220 Continental, 125 mph. cruise. Perfect condition. Certificated. Extra instruments installed. Deliver anywhere for expenses. $2350. Write R. J. Southey, Burlington, Wis. Phone 344.

TIMM—perfect condition. 602 hrs. since new. $1950. Recently repainted yellow and waxed. V. Mack, Ephrata, Wash.

TRAVELAIR

4000, 165 hp Wright, $900. Stillwater Flying Service, Stillwater, Okla.

VULTEE

BT-13 JUST relicensed, low hours. Used in Navy, for sale or trade. $1425. M. Arvig, Wadena, Minn.

BT-13's and 15's. $950-$1250. Low engine time. Radios, instruments. A-1 condition. J. D. Higgins, Jr., Box 873, Cisco, Tex.

BT-15 ALL metal, polished. Clean inside and out. 10 hrs. since major. All instruments. Licensed $1500. W. A. Stames, 232 S. Imperial Ave., Brawley, Calif.

BT-13B. 30 hrs. on engine since factory major. All new gyro instruments in both cockpits. 2-way radio fully converted. Ship beautiful—painted in silver and red. Licensed for day, night and instrument flight. An exceptional good BT. Owner has purchased another ship. Any reasonable offer considered. Ship can be seen at Wilkins Airport, North Attleboro, Mass. Harold Gordon, Interstate Transit Corp., Attleboro, Mass. Phone 173.

SNV-2 MANUFACTURED 1944. Licensed NC64738 June 1946. Airframe and Pratt Whitney built engine 746 total, 151 since overhaul. Radio modified, new paint, all bulletins complied. Full sets instruments including Marker Beacon. Must sell $1650 or will trade for lightplane, late car or Army Jeeps. Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Okla.

WACO

WACO ZQC-6, five place Custom, 285 Jacobs engine with only 56 hrs. time since major; total airplane hours 809; two-way radio; landing lights; complete instrument panel; wheel pants. Airplane in A-1 condition. A bargain at $3900. Aircraft Service Co., Phone 527, P.O. Box 829, Boise, Idaho.

WACO UPF-7 three place; only 120 hrs. on engine since overhaul. Licensed. Good condition. $1295. Arkansas Aviation Service, Grider Field, Pine Bluff, Ark.

AIRPLANES WANTED

WANTED: 1936 Heath. Good condition. Picture and particulars first letter. G. Schmidt, 737 6th St., Oshkosh, Wis.

WANTED: SC Ryan 3 place, low wing monoplane. Capt. Trott, Hemlock, N. Y.

WANTED: Aeronca C-3. Flyable condition. Send your name and address with full particulars to Bill Blake, 131 South Judd St., Sioux City, Iowa.

WANTED to trade: 1946 model Harley Davidson 74 O.H.V. motorcycle for licensed airplane. Machine in excellent condition, fully equipped, 8200 miles. Will deliver. Interested in light plane or Stearman. All inquiries answered. Lawrence Pearson, P.O. Box 1824, Roanoke 8, Virginia.

WILL pay $500.00 for C-3 Aeronca in good condition. Want twin mags. G. W. Dalton, Richlands Airport, Richlands, Va.

PARTS AND ACCESSORIES

ATTENTION AT-19 owners: At last CAA approved 3 passenger rear seat like SR-10D. Bolt-in, easy to install, includes canvas sling and belt attachments. $96.50. Five belts, $10.00 extra. Money talks for same day shipment. Allied Aircraft Co., Clarendon Hills, Ill.

VULTEE owners—we have parts for BT-15, BT-13, and SNV aircraft. Write us for Wright and Wasp, Jr. Used engine parts. We specialize in the licensing of Vultee airplanes. Arkansas Aviation Service, Grider Field, Pine Bluff, Ark., Stinson Distributors.

ENGINES: Warner SS-50 145 hp. Completely overhauled by Navy, look and are just as good as new engines. Packed in cellophane, and in nice crate. Engines include mags, ignition shielding, carburetor, and plugs. Can supply with heavy duty taper shaft, or late type spline shaft. $795 with taper shaft, $895 with spline shaft. John M. Calder, 1011 Crawford Dr., Rockville, Md.

4 CONSTANT speed Hamilton standard propellers with governors for AT-19. Low time, excellent condition. $100 each, crated. Hoffer's Flying Service, Camden, S. C.

8 DAY standard instrument mounting Waltham aircraft clocks. 24 hr. dial and date hand. $18.50. Money order or cashier checks only. Hodnett Bros. & Co., 703 Watts, Durham, N. C.

WELL known Japanese precision instruments for sale; new & unused. Turn & Bank, $11.00; Altimeters, $11.00; Air Speed, $11.00; Tachometers, $16.00; Artificial Horizons, $18.50; Gyro Compasses, $17.00; Electric pitot tubes, $5.00, Postpaid. Bill Hollingsworth, 3109 Carlton Ave., Chattanooga, Tenn.

TIRES new post war—Goodyear—Fresh stock at lowest prices ever. Every size stocked. We are the biggest supplier of tires in the country. Satisfaction guaranteed or we refund. Lowest prices. Immediate deliveries. Fabric. Dope. Bolts. Sensenich propellers. B. G. & Champion spark plugs, storage batteries. Shockcord rings. Windshields, instruments, Scott tailwheel assemblies. Bob Trader Aero Supply, 929 Penn. Ave., Pittsburgh, Pa.

POWERFUL permanent magnets separate or distinguish aluminum parts from steel. Pair—$1.00. Other useful applications described. Ronald Eyrich, Box 849, Milwaukee 1, Wis.

HEATER Sale: (original cost $583.00) Portable gasoline-burning, 100,000 BTU, ground type Stewart-Warner Aircraft Heaters. Complete with turbine type blower and 1½ hp. air-cooled engine, $125.00. American Warehouse, Dept. K, Pueblo, Colo.

WANTED—fuselage & landing gear for J3-L65 Piper Cub. Covered or uncovered. Fuselage must be able to pass inspection. John E. Woolever, Holcombe, Wis.

DIRECTIONAL gyros. Standard or light weight, $24.50. Gyro horizons, $24.50. Kollsman Sensitive Altimeter, $17.50. Pioneer Turn and Bank, $15.00. Pioneer 0-2000 Rate of Climb, $15.00. Prepaid on receipt of cash, certified check or money order. Hoffer's Flying Service, Camden, S. C.

FOR SALE: Bulova clock, Pioneer turnbank, Bendix compass, gyro horizon, directional gyro, Kollsman altimeter; the above are unused; also, used Bendix rate of climb. First money order of $450 takes all. Paul Carpenter, Northfield Falls, Vt.

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ALL AIRCRAFT LISTED ARE LICENSED

DEALER	MODEL NO.	TYPE ENGINE	YEAR BUILT	TOTAL HOURS		HOURS SINCE LAST MAJOR OVERHAUL		PRICE
				PLANE	ENGINE	PLANE	ENGINE	
AERONCA								
Dows Flying Service Inc., Dows, Iowa	11AC	Cont. 65	1946	7	7	7	7	$2,750.00
Down East Airlines, Maine State Airport, Augusta, Maine	7AC	Cont. 65	1946	15:50	15:50	15:50	15:50	2,520.00
Round Lake Flying Club, Inc., Round Lake, New York	S65CA	Cont. 65	1941	2577	869	1045	280	2,500.00
Lewis F. Lavery, Round Lake, New York	S65CA	Cont. 65	1940	3146	3320	297	0	2,500.00
A. C. Schmidt, Republic Airport, Farmingdale, New York	11AC	Cont. 65	1946	253	253	0	0	2,500.00
Blackwell Flying Service, Box 146, Vale, Oregon	7AC	Cont. 65	1946	140	140	140	140	2,485.00
Mohall Flying Service, Mohall, North Dakota	7AC	Cont. 65	1946	233	233	233	233	2,400.00
Goddard Flying Service, Ardmore Airport, Ardmore, Oklahoma	LA65	Cont. 65	1939	909	0	909	0	2,400.00
Bell Aero Service, Route No. 3, Baraboo, Wisconsin	7AC	Cont. 65	1946	128	128	128	128	2,325.00
Williams Airpark, Madisonville, Kentucky	7AC	Cont. 65	1946	30	30	0	0	2,300.00
Ladysmith Flying Service, Box 405, Ladysmith, Wisconsin	7AC	Cont. 65	1946	139	139	139	139	2,300.00
Williams Airpark, Madisonville, Kentucky	7AC	Cont. 65	1946	178:30	178:30	0	0	2,250.00
Grieser Flying Service, Grieser Airport, R. R. No. 2, Wauseon, Ohio	7AC	Cont. 65	1946	160	160	160	160	2,250.00
Eagleton & Farrens Flying Service, Decatur, Nebraska	7AC	Cont. 65	1946	30	30	30	30	2,250.00
Tri-State Airways, Tri-State Airport, Angola, Indiana	7AC	Cont. 65	1946	98	98	98	98	2,250.00
Tri-State Airways, Tri-State Airport, Angola, Indiana	7AC	Cont. 65	1946	152	152	152	152	2,250.00
Kenneth F. Smith, Coshocton Airport, Coshocton, Ohio	7AC	Cont. 65	1946	60	60	0	0	2,245.00
Tri-State Airways, Tri-State Airport, Angola, Indiana	7AC	Cont. 65	1946	245	245	245	0	2,175.00
Edwin K. Beck, Mapleton Airport, Seymour, Indiana	7AC	Cont. 65	1946	240	240	240	240	2,155.00
Skyway Enterprises, Inc., Box 120, Beaver Dam, Wisconsin	7AC	Cont. 65	1946	175	175	0	0	2,150.00
Tri-City Air Service, P. O. Box 145, Watertown, Wisconsin	7AC	Cont. 65	1946	218	226	218	226	2,150.00
Connecticut Valley Air Service, White Mt. Air Terminal, Whitefield, New Hampshire	7AC	Cont. 65	1946	150	150	150	150	2,150.00
Gridley Flying Service, Box 56, Ypsilanti, Michigan	7AC	Cont. 65	1946	290	290	290	290	2,150.00
DeLong Aviation Service, Gainesville, Georgia	7AC	Cont. 65	1946	20	20	0	0	2,150.00
Eagleton & Farrens Flying Service, Decatur Airport, Decatur, Nebraska	7AC	Cont. 65	1946	110	110	110	110	2,150.00
Williams Airpark, Madisonville, Kentucky	7AC	Cont. 65	1946	130	130	0	0	2,150.00
Champion-Wright Flying Service, Municipal Airport, Oxford, Mississippi	7AC	Cont. 65	1946	290	290	290	290	2,100.00
Flite Rite Aviation, Municipal Airport, Chanute, Kansas	7AC	Cont. 65	1946	300	300	300	300	2,100.00
Intercity Flying Service, Municipal Airport, Fort Wayne 8, Indiana	7AC	Cont. 65	1946	160	160	160	160	2,100.00
Tri-City Air Service, P. O. Box 145, Watertown, Wisconsin	7AC	Cont. 65	1946	420	150	420	150	2,095.00
Johnson Air Activities, Box 192, Tel. 19J, Sidney, Nebraska	7AC	Cont. 65	1946	290	290	290	290	2,075.00
Eddy McEnnan, McEnnan Airport, Ypsilanti, Michigan	Chief	Cont. 65	1941	256	256	256	35	2,050.00
Tri-State Airways, Tri-State Airport, Angola, Indiana	7AC	Cont. 65	1946	265	303	0	0	2,050.00
Detloff Flying Service, Bedford Airport, Bedford, Ohio	7AC	Cont. 65	1946	105	105	105	105	2,010.00
Duane D. Otis, Huntingburg Airport, Huntingburg, Indiana	7AC	Cont. 65	1946	200	200	200	200	2,000.00
Mohall Flying Service, Mohall, North Dakota	CA65	Cont. 65	1940	656	656	190	190	2,000.00
Park Region Aviation, Inc., Fergus Falls, Minnesota	7AC	Cont. 65	1946	396	396	396	0	2,000.00
Claud Akin, Box 342, Danville, Kentucky	7AC	Cont. 65	1946	68:20	68:20	68:20	68:20	2,000.00
Warner Kenyon, 1326 Twenty-ninth Street, Ashland, Kentucky	Champion	Cont. 65	1946	.....	170	170	170	1,975.00
Johnson Air Activities, Box 192, Sidney, Nebraska	Chief	Cont. 65	1941	550	550	550	550	1,975.00
Aeronca Airpark Aeronca Sales & Service, Hicksville Airpark, Long Island, New York	7AC	Cont. 65	1946	150	150	150	150	1,950.00
Princeton Airport, 1652 Princeton Avenue, Trenton, New Jersey	7AC	Cont. 65	1946	141	141	141	141	1,950.00
Duane D. Otis, Huntingburg, Huntingburg, Indiana	7AC	Cont. 65	1946	160	160	160	160	1,950.00
Inter-City Flying Service, Municipal Airport, Ft. Wayne 8, Indiana	7AC	Cont. 65	1946	501	501	501	501	1,925.00
Wade Flying Services Inc., Bowman Field, Louisville 5, Kentucky	7AC	Cont. 65	1946	867:40	867:40	867:40	80:35	1,900.00
Dows Flying Service, Inc., Dows, Iowa	Chief	Cont. 65	1941	1500	1100	300	100	1,900.00
Wade Flying Services Inc., Bowman Field, Louisville 5, Kentucky	7AC	Cont. 65	1946	752:45	660:55	752:45	0	1,900.00
Wade Flying Services Inc., Bowman Field, Louisville 5, Kentucky	7AC	Cont. 65	1946	822:05	822:05	822:05	87:10	1,900.00
Eddy McEnnan, McEnnan Airport, Ypsilanti, Michigan	7AC	Cont. 65	1946	450	185	450	185	1,900.00
French Aero Service, Washington Airpark, Washington Court House, Ohio		LeBlond 90	1936	400	400	100	50	1,895.00
Ruscoe Flying Service, Shinn-Woodbridge Airport, Iselin, New Jersey	7AC	Cont. 65	1946	250	250	250	250	1,850.00
Inter-City Flying Service, Municipal Airport, Fort Wayne 8, Indiana	CA	Cont. 65	1941	1873	453	845	453	1,850.00
Johnie Cleveland Air Service, 322 Downing Street, Jackson, Mississippi	7AC	Cont. 65	1946	245	245	245	245	1,800.00
Inter-City Flying Service, Municipal Airport, Fort Wayne 8, Indiana	CA	Cont. 65	1941	2380	524	2380	524	1,800.00
Ruscoe Flying Service, Shinn-Woodbridge Airport, Iselin, New Jersey	7AC	Cont. 65	1946	300	300	300	300	1,800.00
Carleton-Whitney Aero Service Inc., Wilkins Airport, No. Attleboro, Massachusetts	7AC	Cont. 65	1946	420	420	420	420	1,800.00
Carl ton-Whitney Aero Service Inc., Wilkins Airport, No. Attleboro, Massachusetts	7AC	Cont. 65	1946	430	430	430	430	1,800.00
Washington Flying Service, Washington, Iowa	CA65	Cont. 65	1941	2523	2523	816	816	1,750.00
French Aero Service, Washington Airpark, Washington Court House, Ohio	7AC	Cont. 65	1946	600	600	600	100	1,700.00
Aero Industries Corporation, Municipal Airport, New Haven, Connecticut	L3B	Cont. 65	1943	1200	600	1200	600	1,700.00
Williams Airpark, Madisonville, Kentucky	7AC	Cont. 65	1946	370	370	0	0	1,695.00
Pulaski Flying Service, Pulaski, Tennessee	Tandem	Cont. 65	1943	600	600	10	50	1,600.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	Chief	Cont. 55	1939	1300	1300	200	200	1,500.00
Johnie Cleveland Air Service, 3221 Downing St., Jackson, Mississippi		Lyc. 65	1939	1115	1115	120	120	1,500.00
Tri-State Airways, Tri-State Airport, Angola, Indiana	L3B	Cont. 65	1944	350	225	0	0	1,450.00
Rac Aero Flying Club, Republic Aviation, Farmingdale, New York	TC	Cont. 65	1940	1487	1487	1487	157	1,400.00
Aero Industries Corp., Municipal Airport, New Haven, Connecticut	L3B	Cont. 65	1943	900	900	900	355	1,400.00
Inter-City Flying Service, Municipal Airport, Fort Wayne 8, Indiana	CA	Cont. 65	1941	1874	454	879	54	1,400.00
Rac Aero Flying Club, Republic Airport, Farmingdale, New York	TAL	Lyc. 65	1941	2201	2201	2201	148	1,400.00
Inter-City Flying Service, Municipal Airport, Fort Wayne 8, Indiana	CA	Cont. 65	1941	2406	1149	2406	550	1,350.00
Airgo, Smith Field, Fort Wayne, Indiana	TAC	Cont. 65	1942	1500	1050	300	300	1,350.00
Clear Ridge Aviation, Inc., 72nd and Crown Point Avenue, Omaha, Nebraska	TAL	Lyc. 65	1942	2195	2195	33	33	1,350.00
Ruscoe Flying Service, Shinn-Woodbridge Airport, Iselin, New Jersey	Trainer	Cont. 65	1943	650	650	100	100	1,300.00
Rac Aero Flying Club, Republic Aviation, Farmingdale, New York	TAF	Frank. 65	1941	2365	2365	2365	140	1,300.00
Narragansett Airways, Riconn Airport, Route 14, Greene, Rhode Island	TF	Frank. 60	1940	700	700	90	90	1,225.00
L. I. Aretz, R. R. 3, Lafayette, Indiana	TL	Lyc. 65	1941	1200	700	1200	700	1,200.00
Carleton-Whitney Aero Service Inc., Wilkins Airport, No. Attleboro, Massachusetts	TL	Lyc. 65	1941	1450	1389	250	403	1,200.00
Clear Ridge Aviation, Inc., 72nd and Crown Point Avenue, Omaha, Nebraska	TAF	Frank. 65	1942	1719	1719	50	230	950.00
BEECH								
Hawthorne Flying Service, Orangeburg, South Carolina	D18S	450 Wasp	1946	195	195	195	195	55,000.00
Spartan Aero Repair, Municipal Airport, Tulsa, Oklahoma	AT-11	P & W 450	1942	2194	2758	2194	2758	35,000.00
Public Flyers, Nassau Airpark, Princeton, New Jersey	18A	Wright 320	1937	1194	405	1194	405	25,000.00
BELLANCA								
Inter-City Flying Service, Municipal Airport, Fort Wayne 8, Indiana	Cruisaire	Frank. 150	1946	120	12	120	12	8,995.00
BOEING								
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	PT-17	Cont. 220	1943	400	400	400	400	1,500.00
Tropical Airways, Inc., Drew Field, Tampa 1, Florida	PT-17	Cont. 220	1942	1942	2550	1595	350	1,150.00
CESSNA								
The Coogan Co., 8440 Sunset Boulevard, Hollywood, California	T-50	Jacobs 225	1943	1495	0	0	0	15,500.00
Hawthorne Flying Service, Orangeburg, South Carolina	UC-78	Jacobs 225	1943	871:50	635	871:50	635	13,500.00
Hawthorne Flying Service, Inc., Columbia, South Carolina	UC-78	Jacobs 225	1943	760:40	1068:40	760:40	131:20	12,000.00
Air Services, Inc., Washington National Airport, Washington, D. C.	UC-78	Jacobs 225	1944	892	685	892	0	10,500.00

DEALER	MODEL NO.	TYPE ENGINE	YEAR BUILT	TOTAL HOURS		HOURS SINCE LAST MAJOR OVERHAUL		PRICE
				PLANE	ENGINE	PLANE	ENGINE	
Hawthorne Flying Service, Inc., Greensboro-High Point, Greensboro, North Carolina	UC-78	Jacobs 225	1943	739:30	751:40	158:40	118:30	10,000.00
Max Vinall, Monrovia, Airport, Monrovia, California	UC-78	Jacobs	1944	1100	1100	700	213	8,500.00
Airgo, Smith Field, Fort Wayne, Indiana	T-50	Jacobs 225	1944	1350	1400	200	400	8,500.00
Byerly-Wagener Aviation, Mt. Hawley Airport, Peoria, Illinois	T-50	Jacobs 225	1943	1504	1534	4	469	8,500.00
Goddard Flying Service, Ardmore Airport, Ardmore, Oklahoma	T-50	Jacobs 225	1943	1200	210	100	0	8,000.00
St. Louis Flying Service, Kratz Field, St. Louis, Missouri	UC-78	Jacobs 225	1943	763	696	763	129	7,900.00
Goddard Flying Service, Ardmore Airport, Ardmore, Oklahoma	T-50	Jacobs 225	1943	1150	220	20	220	7,500.00
St. Louis Flying Service, Kratz Field, St. Louis, Missouri	UC-78	Jacobs 225	1943	750	750	750	750	7,300.00
Farly's Air Park, Box 72, New Baltimore, New York	UC-78	Jacobs 225	1944	700	310	700	300	7,100.00
St. Louis Flying Service, Kratz Field, St. Louis, Missouri	UC-78	Jacobs 225	1943	1448	1713	1448	392	6,900.00
Southern Airways, Inc., Route No. 224, Youngstown, Ohio	UC-78	Jacobs 225	1943	875	875	875	875	6,000.00
Atlantic Aviation Service, Du Pont Airport, Wilmington, Delaware	T-50	Jacobs 225	1941	2508	2433	460	460	4,000.00
Hair Flying Service, 708 Orleans Street, Natchez, Mississippi	140	Cont. 85	1946	41	41	41	41	3,650.00
James A. Crenshaw, Dyersburg Flying Service, Dyersburg, Tennessee	140	Cont. 85	1946	40	40	0	0	3,450.00
Clear Ridge Aviation, Inc., 72nd and Crown Point Avenue, Omaha, Nebraska	140	Cont. 85	1946	175	175	175	175	3,375.00
Alabama Air Service, P. O. Box 2188, Montgomery, Alabama	120	Cont. 85	1946	43	43	43	43	3,000.00
CHAMPION								
Dows Flying Service, Inc., Dows, Iowa	7A7	Cont. 65	1946	125	125	125	125	2,250.00
Dows Flying Service, Inc., Dows, Iowa	7AC	Cont. 65	1946	355	355	355	355	2,100.00
CULVER								
Gillis Flying Service, P. O. Box 1718, Billings, Montana	LFA	Frank. 80	1941	400	400	400	400	2,995.00
Reed Flying Service, Box 100, Wewoka, Oklahoma	LFA	Frank. 80	1941	250	250	250	250	2,750.00
Les Kahl, 1422 South 6th Avenue, Tucson, Arizona	LFA	Frank. 80	1941	300	300	65	65	2,600.00
ERCOUPE								
Culver Flying Service, Inc., Municipal Airport, Evansville, Indiana	415	Cont. 75	1946	23	23	23	23	3,300.00
Connecticut Valley Air Service, White Mt. Air Terminal, Whitefield, New Hampshire	415	Cont. 75	1946	67	67	67	67	3,200.00
Cairo Flying Service, Airport, Cairo, Illinois		Cont. 75	1946	40	40	40	40	3,150.00
Syracuse Flying School, Syracuse Airport, Syracuse, New York	415	Cont. 75	1946	275	275	275	15	2,950.00
Claud Akin, Box 342, Danville, Kentucky	415	Cont. 75	1946	103:10	103:10	103:10	103:10	2,900.00
Red Bank Airport, Inc., P. O. Box 28, Red Bank, New Jersey	415	Cont. 75	1946	225	225	225	225	2,800.00
Connecticut Valley Air Service, White Mt. Air Terminal, Whitefield, New Hampshire	415	Cont. 75	1945	457	328	457	328	2,500.00
Northern Air Service, Inc., Kent County Airport, Grand Rapids, Michigan	415	Cont. 75	1941	400	400	400	70	2,250.00
FAIRCHILD								
Park Region Aviation, Inc., Fergus Falls, Minnesota	F-24	Ranger 175	1946	8	8	0	0	5,000.00
Henson Flying Service, Inc., Hagerstown, Hagerstown Municipal Airport, Hagerstown, Maryland	F24R46	Ranger 175	1946	20	20	20	20	8,875.00
Down East Airlines, Maine State Airport, Augusta, Maine	F24R	Ranger 175	1946	105:35	105:35	105:35	105:35	8,495.00
St. Louis Flying Service, Kratz Field, St. Louis, Missouri	24-G	Warner 145	1943	1388	209	133	209	5,500.00
F. A. Pease, 1075 California Street, San Francisco 8, California	24-W	Warner 145	1939	850	850	850	150	5,100.00
The Coogan Company, 8440 Sunset Boulevard, Hollywood 46, California	24-R-40	Ranger 175	1940	466	466	66	66	4,850.00
Detroit Seaplane Base Inc., 100 Meadowbrook, Detroit 14, Michigan	24-G	Warner 145	1937	1775	2050	650	250	4,700.00
Detroit Seaplane Base Inc., Foot of Meadowbrook, Detroit 14, Michigan	24-G	Warner 145	1937	1780	2020	1780	30	4,600.00
Buffalo Aeronautical Corp., Buffalo Airport, Buffalo 11, New York	24	Ranger	1936	1772	1772	150	150	3,850.00
The Gannoe Flying Service, Inc., Box 389, New London, Connecticut	26-A	Ranger 200	1943	500	500	500	500	3,250.00
Billings Airpark, Box 57, Ellsworth, Maine	PT-23	Cont. 220	1943	175	175	175	175	2,200.00
Midwest Flyers, Lakeside Airport, East St. Louis, Illinois	PT-26	Ranger 200	1943	1600	1065	1600	82	2,150.00
Rawdon Bros. Flying Service, P. O. Box 1135, Wichita, Kansas	PT-19	Ranger 175	1943	250	250	25	250	1,800.00
Stockton Airport, Stockton, Illinois	M62A	Ranger 175	1942	695	695	695	695	1,800.00
The Gannoe Flying Service, Inc., Box 389, New London, Connecticut	PT-19	Ranger 175	1943	290	290	290	290	1,600.00
Sax Aviation Company, Dickinson, North Dakota	PT-19	Ranger 175	1944	520	520	10	10	1,600.00
Frank M. Tehinnis, 10 Sherman Road, Farmingdale, Long Island, New York	PT-23	Cont. 220	1943	230	230	230	230	1,600.00
Via Air, St. Clair Co. Airport, Port Huron, Michigan	PT-19	Ranger 175	1942	1600	300	300	390	1,500.00
John L. Coppernoll, Stockton, Illinois	M62A	Ranger 175	1942	500	500	500	500	1,400.00
Francis School of Aviation, Capitol City Airport, Lansing, Michigan	PT-19	Ranger 175	....	2883	1554	120	1554	1,400.00
Arkansas Aviation Service, Grider Field, Pine Bluff, Arkansas	PT-19A	Ranger 175	1941	1050	1400	1050	345	1,295.00
FLEET								
Charles Lo Piccolo, Pickair Seaplane Base, Ossining, New York	505	Jacobs 300	1940	1400	70	70	70	1,600.00
Dobbs Ferry Seaplane Base, Station Plaza, Dobbs Ferry, New York	II	Kinner 110	1929	3687	1081	6:10	6:50	1,100.00
GLOBE								
R. E. King, Box 537, Milledgeville, Georgia	6G10	Cont. 125	1946	40	40	0	0	5,500.00
Hattiesburg Flying Service, Box 749, Hattiesburg, Mississippi	7C1A	Cont. 85	1946	130	1	0	0	4,195.00
Gillis Flying Service, Billings, Montana	GC-1B	Cont. 125	1946	15	15	15	15	4,500.00
Skyway Enterprises, Inc., Box 120, Beaver Dam, Wisconsin	GC-1B	Cont. 125	1946	50	50	0	0	4,200.00
DeLong Aviation Service, Gainesville, Georgia	GC-1A	Cont. 85	1946	20	20	0	0	3,800.00
GRUMMAN								
Berry's Aviation Service, 5466 South Kenwood Avenue, Chicago 15, Illinois	4444	Ranger 200	1942	287	303	287	303	25,500.00
HOWARD								
The Coogan Co., 8440 Sunset Boulevard, Hollywood 46, California	DGA15P	P & W 450	1943	460	460	0	0	10,500.00
Berry's Aviation Service, 5466 South Kenwood Avenue, Chicago 15, Illinois	1376	P & W 450	1943	520	530	520	32	9,800.00
Dethloff Flying Service, Bedford Airport, Bedford, Ohio	DGA18	Warner 125	1941	2000	700	2000	425	1,850.00
INTERSTATE								
Hanford Aero Service, Municipal Airport, Hanford, California	SIBI	Frank. 113	1943	350	350	87	87	2,175.00
KITTYHAWK								
Hall Air Service, West Haven Airport, West Haven, Connecticut	B-5	Kinner 125	1933	2200	2200	2200	100	995.00
LUSCOMBE								
Sea Wings Inc., Westport, Connecticut	8A	Cont. 65	1946	275	275	275	275	3,750.00
John L. Coppernoll, Stockton, Illinois		Cont. 65	1946	50	50	50	50	3,125.00
Blackwell Flying Service, Airport, Box 147, Vale, Oregon	8A	Cont. 65	1946	110	110	110	110	2,995.00
John L. Coppernoll, Stockton, Illinois	Silvaire	Cont. 65	1946	85	85	85	85	2,850.00
Syracuse Flying School, Syracuse Airport, Syracuse, New York	8A	Cont. 65	1946	275	275	275	15	2,800.00
Airgo, Smith Field, Fort Wayne, Indiana	8A	Cont. 65	1946	300	300	300	300	2,600.00
Down East Airlines, Maine State Airport, Augusta, Maine	8A	Cont. 65	1946	89:20	89:20	89:20	89:20	2,495.00
Spartan Aero Repair, Municipal Airport, Tulsa, Oklahoma	8C	Cont. 75	1941	1115	150	1115	150	2,475.00
Clear Ridge Aviation, Inc., 72nd and Crown Point Avenue, Omaha, Nebraska	8A	Cont. 65	1941	550	550	78	78	2,450.00
Clear Ridge Aviation, Inc., 72nd and Crown Point Avenue, Omaha, Nebraska	8A	Cont. 65	1941	1003	1003	88	78	2,375.00
Northern Air Service, Inc., Kent County Airport, Grand Rapids, Michigan	8A	Cont. 75	1941	2242:30	651:10	2242:30	145:25	2,250.00
Princeton Airport, 1652 Princeton Avenue, Trenton, New Jersey	8C	Cont. 75	1940	337:20	337:20	337:20	337:20	250.00
MEYERS								
Stoudt Flying Service, Inc., Municipal Airport, Muscatine, Iowa	OTW	Warner 125	1942	1250	1982	1250	400	1,550.00
MONOCOUPE								
T. H. Davis, Smith Reynolds Airport, Winston-Salem, North Carolina	90AF	Frank. 90	1940	678	678	110:20	110:20	3,650.00
A. D. Zaebst, Box 601, Ocala, Florida	90AF	Frank. 90	1943	1200	1200	10	10	3,000.00
Pacific Airmotive Corporation, Oakland Municipal Airport, Oakland, California	90A	Lambert 90	1936	500	500	500	0	2,900.00
St. Louis Flying Service, Kratz Airport, St. Louis, Missouri	90A	Lambert 90	1941	673	673	673	57	2,750.00
Frank Gray, Brigham Airport, Portland, Indiana	90AF	Frank. 90	1941	1261	1261	1261	80	2,400.00
NAVY								
Francis School of Aviation, Capitol City Airport, Lansing, Michigan	N3N	Wright 35	....	2393	2631	176:25	176:25	1,200.00
Frank Reiser, 19 White Street, Paterson, New Jersey	N3N	Wright	1942	235	375	235	375	850.00

DEALER	MODEL NO.	TYPE ENGINE	YEAR BUILT	TOTAL HOURS		HOURS SINCE LAST MAJOR OVERHAUL		PRICE
				PLANE	ENGINE	PLANE	ENGINE	
NORTH AMERICAN								
Farley's Airpark, Box 72, New Baltimore, New York	AT-6	P & W 600	1944	700	700	0	169	$3,000.00
St. Louis Flying Service, Kratz Field, St. Louis 21, Missouri	AT-6	P & W 550	1943	3777	2672	3777	151	2,895.00
St. Louis Flying Service, Kratz Field, St. Louis 21, Missouri	AT-6	P & W 550	1943	5234	2056	5234	167	2,795.00
St. Louis Flying Service, Kratz Field, St. Louis 21, Missouri	AT-6	P & W 550	1943	3858	1802	3858	177	2,675.00
Aircraft Sales Co., Meacham Field, Fort Worth, Texas	SNJ-2	P & W 550	1940	1924	1599	127	136	2,600.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	AT-6B	P & W 600	1942	3185	433	10	433	2,500.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	AT-6B	P & W 650	1943	3182		3	433	2,500.00
Airgo, Smith Field, Fort Wayne, Indiana	SNJ	P & W 650	1943	2500	1250	500	250	1,900.00
Aerographic Co., 830 Union Street, New Orleans 12, Louisiana	SNJ-2	P & W 550	1941	2290	1430	466	466	1,845.00
Aerographic Co., 830 Union Street, New Orleans 12, Louisiana	AT-6B	P & W 550	1942	3300	433	3300	433	1,775.00
Hoffer's Flying Service, Camden, South Carolina	SNJ-3	P & W 600	1942	1776	2476	327	337	1,775.00
Aerographic Co., 830 Union Street, New Orleans 12, Louisiana	SNJ-4	P & W 550	1942	2780	1180	720	63	1,775.00
Aerographic Co., 830 Union Street, New Orleans 12, Louisiana	SNJ-4	P & W 550	1942	3325	1168	1350	138	1,750.00
Hoffer's Flying Service, Camden, South Carolina	SNJ-4	P & W 600	1943	1061	1806	378	385	1,375.00
PIPER								
Detroit Seaplane Base, Inc., 100 Meadowbrook, Detroit 14, Michigan	J3-C Sea	Cont. 65	1946	363	363	363	363	2,500.00
Detroit Seaplane Base, Inc., Foot of Meadowbrook, Detroit 14, Michigan	J3-C Sea	Cont. 65	1946	370	370	370	370	2,500.00
The Gannoe Flying Service, Inc., Box 389, New London, Connecticut	J3	Cont. 53	1946	0	0	0	0	2,300.00
The Gannoe Flying Service, Inc., Box 389, New London, Conn.	J3	Cont. 65	1946	0	0	0	0	2,300.00
Johnnie Cleveland Air Service, 3221 Downing St., Jackson, Mississippi	J5	Lyc. 75	1941	915	915	30	30	2,250.00
Bilhobs Flying Service, Rt. 2, Wilmington Island, Savannah, Georgia	J5-C	Cont. 75	1941	1200	50	50	50	2,200.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	J4	Cont. 65	1939	450	450	450	50	2,200.00
David Bros. Flying Service, Daleville Airport, R.D. 3, Moscow, Pennsylvania	J3	Cont. 65	1945	58	58	58	58	2,195.00
Warner Kenyon, 1326 29th St., Ashland, Kentucky	J3-C	Cont. 65	1946	140	140	140	140	2,195.00
Continental Divide Aviation, Municipal Airport, Rawlins, Wyoming	J3-C	Cont. 65	1946	60	60	60	60	2,180.00
Tri-City Air Service, P.O. Box 145, Watertown, Wisconsin	J5-C	Cont. 75	1940	1700	1750	240	250	2,150.00
H. A. Talbott, Chappell, Nebraska	J4-E	Cont. 75	1941	480	480	480	480	2,150.00
Plainfield Airways, Inc., Plainfield, New Jersey	J5	Cont. 65	1941	450	450	450	450	2,100.00
Flint Flying Service, Bishop Airport, Flint, Michigan	J3-C	Cont. 65	1946	100	100	100	100	2,100.00
Plainfield Airway, Inc., Plainfield, Connecticut	J5-A	Cont. 75	1941	400	420	30	30	2,100.00
Stockton Airport, Stockton, Illinois	J3	Cont. 65	1946	85	85	85	85	2,100.00
Evergreen Airport, Warren, Illinois	J3	Cont. 65	1946	68	68	68	68	2,050.00
Atlantic Aviation Service, Du Pont Airport, Wilmington, Delaware	J4	Cont. 65	1939	518	518	518	77	2,050.00
Alabama Air Service, P.O. Box 2188, Montgomery, Alabama	J3-C	Cont. 65	1946	661:40	661:40	661:40	0	2,000.00
Stockton Airport, Stockton, Illinois	J3	Cont. 65	1946	90	90	90	90	2,000.00
Rhodes and Stormes, Lawrence Airport, Corry, Pennsylvania	J3	Cont. 65	1946	110	110	0	0	2,000.00
The Gannoe Flying Service, Inc., Box 389, New London, Connecticut	J3	Cont. 65	1946	217	217	217	217	2,000.00
Doyle Sutliff, Benton, Pennsylvania	J4	Cont. 65	1940	668	671	668	671	2,000.00
Gridley Flying Service, Box 56, Ypsilanti, Michigan	J5-A	Cont. 75	1941	1479	1479	479	479	1,995.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	J3	Cont. 65	1946	[illegible]	30	30	30	1,975.00
The Gannoe Flying Service, Inc., Box 389, New London, Connecticut	J5-A	Cont. 75	1946	1270:25	1270:25	126:40	126:40	1,900.00
Gardiner Flying Service, Medford Airport, Medford, Wisconsin	J3	Cont. 65	1945	339	340	339	340	1,900.00
Buffalo Aeronautical Corp., Buffalo Airport, Buffalo, New York	J4-E	Cont. 75	1941	968:20	968:20	968:20	107:15	1,900.00
Hall Air Service, West Haven Airport, West Haven, Connecticut	J5-A	Cont. 75	1941	100	110	100	110	1,895.00
Continental Divide Aviation, Municipal Airport, Rawlins, Wyoming	J3-C	Cont. 65	1946	460	460	0	0	1,875.00
Continental Divide Aviation, Municipal Airport, Rawlins, Wyoming	J3-C	Cont. 65	1946	330	330	0	0	1,875.00
Hall Air Service, West Haven Airport, West Haven, Connecticut	J5-A	Cont. 75	1941	1268	2042	0	0	1,865.00
The Gannoe Flying Service, Inc., Box 389, New London, Connecticut	J3	Cont. 65	1946	385:40	385:40	385:40	385:40	1,850.00
Flint Flying Service, Bishop Airport, Flint, Michigan	J3-C	Cont. 65	1946	200	200	200	200	1,850.00
Flint Flying Service, Bishop Airport, Flint, Michigan	J3-C	Cont. 65	1946	260	260	260	260	1,850.00
The Gannoe Flying Service, Inc., Box 389, New London, Connecticut	J3	Cont. 65	1946	506:15	506:15	506:15	506:15	1,850.00
The Gannoe Flying Service, Inc., Box 389, New London, Connecticut	J3	Cont. 65	1946	249:40	249:40	249:40	249:40	1,850.00
The Gannoe Flying Service, Inc., Box 389, New London, Connecticut	J3	Cont. 65	1946	491:40	491:40	491:40	491:40	1,850.00
Roy Shafer, Carrizozo, New Mexico	J4	Cont. 65	1939	650	480	120	210	1,850.00
Warner Kenyon, 1326 29th St., Ashland, Kentucky	J3-C	Cont. 65	1946	200	200	200	200	1,800.00
Flint Flying Service, Bishop Airport, Flint, Michigan	J3-C	Cont. 65	1946	400	400	400	400	1,800.00
Bilhobs Flying Service, Rt. 2, Wilmington Island, Savannah, Georgia	J4	Cont. 65	1939	75	75	75	0	1,800.00
Ray Devener, Devener Airport, Hanover, Pennsylvania	J5	Cont. 75	1940	760	770	400	370	1,800.00
R. H. Bemis, R.R. No. 1, Sparta, Wisconsin	J3	Cont. 65	1946	35	35	35	35	1,800.00
Bilhobs Flying Service, Rt. 2, Wilmington Island, Savannah, Georgia	J3	Lyc. 65	1940			200	200	1,800.00
Witcher Flying Service, Georgetown, South Carolina	J3	Cont. 65	1946	86	86	86	86	1,795.00
Continental Divide Aviation, Municipal Airport, Rawlins, Wyoming	J3-C	Cont. 65	1946	450	450	450	450	1,795.00
Continental Divide Aviation, Municipal Airport, Rawlins, Wyoming	J3-C	Cont. 65	1946	450	450	450	450	1,795.00
Davis Bros. Flying Service, Daleville Airport, R.D. 3, Moscow, Pennsylvania	J3	Cont. 65	1943	827	991	82	340	1,779.00
The Gannoe Flying Service, Inc., Box 389, New London, Connecticut	J3	Cont. 65	1946	496:40	496:40	496:40	496:40	1,775.00
Aero Industries Corp., Municipal Airport, New Haven, Connecticut	J3-C	Cont. 65	1943	1250	1000	50	0	1,700.00
Witcher Flying Service, Georgetown, South Carolina	J3	Cont. 65	1946	160	160	160	160	1,695.00
Maheu's Airport, Inc., R.F.D. No. 2, Mechanic Falls, Maine	J3	Lyc. 65	1941	3161:30	2862:15	85:15	32	1,695.00
Dethloff Flying Service, Bedford Airport, Bedford, Ohio	J3	Cont. 65	1943	800	700	150	100	1,650.00
Continental Divide Aviation, Municipal Airport, Rawlins, Wyoming	J3-C	Cont. 65	1941	500	500	500	500	1,635.00
D. G. Flying Service, Elwood Airport, Elwood, Indiana	J3	Frank. 65	1941	2009	2461	0	0	1,600.00
Crays Flying Service, 124 East Main Street, Bloomfield, Indiana	J3	40 H.P.		2000	2000	0	0	1,600.00
Arkansas Aviation Service, Grider Field, Pine Bluff, Arkansas	J4-A	Cont. 65	1939	1200	1200	1200	50	1,595.00
C. L. Graham, Gadsden Flying Service, Inc., Gadsden, Alabama	J3-L	Lyc. 65	1941	3052:57	1733:05	4	8	1,595.00
Continental Divide Aviation, Municipal Airport, Rawlins, Wyoming	J3-C	Cont. 65	1940	3811	530	530	530	1,575.00
Midwest Flyers, Lakeside Airport, E. St. Louis, Illinois	J3-L	Lyc. 65	1941	2500	1500	300	200	1,575.00
Detloff Flying Service, Bedford Airport, Bedford, Ohio	J3	Cont. 65	1943	800	700	200	200	1,500.00
Red Bank Airport, Inc., Box 28, Red Bank, New Jersey	J3	Lyc. 65	1941	175	1900	175	175	1,500.00
North Michigan Air Service, Inc., Petoskey, Michigan	J3	Cont. 65	1940	2173	26	26	26	1,500.00
Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Oklahoma	J3-C	Cont. 65	1940	3945	1948	475	0	1,500.00
Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Oklahoma	J3-C	Cont. 65	1940	3166	3605	300	0	1,500.00
Maheu's Airport, Inc., R.F.D. No. 2, Mechanic Falls, Maine	J3	Lyc. 65	1941	3134	2829	57	207	1,495.00
Maheu's Airport, Inc., R.F.D. No. 2, Mechanic Falls, Maine	J3	Lyc. 65	1941	3077:30	1701:45	520:15	524:55	1,495.00
Maheu's Airport, Inc., R.F.D. No. 2, Mechanic Falls, Maine	J3	Lyc. 65	1941	3411:45	1836:25	112:35	642:25	1,495.00
Ray's Flying Service, Dickerson Lane, Falmouth, Kentucky	J3	Lyc. 65	1940	3020	3020	242	242	1,450.00
Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Oklahoma	J3-C	Cont. 65	1940	4050	2931	400	312	1,450.00
Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Oklahoma	J3-C	Cont. 65	1941	3915	1855	750	425	1,450.00
Dixie Air, Inc., Tuscaloosa, Alabama	J3-L	Lyc. 65	1939	2000	500	200	0	1,450.00
Skyway Enterprises, Inc., Box 120, Beaver Dam, Wisconsin	J3-L	Lyc. 65	1939	1200	1000	105	105	1,450.00
The Lakin Flying Service, Inc., P.O. Box 317, Warrensburg, Missouri	J4-A	Cont. 65	1942	885	945	65	65	1,450.00
The Gannoe Flying Service, Inc., Box 389, New London, Connecticut	J3	Lyc. 65	1941	3301:10	3301:10	581:10	581:10	1,450.00
C. L. Graham, Gadsden Flying Service, Inc., Gadsden, Alabama	J3-L	Lyc. 65	1941	2096:25	2090:35	838	283:23	1,450.00
C. L. Graham, Gadsden Flying Service, Inc., Gadsden, Alabama	J3-C	Cont. 65	1939	3087:25	2004	37	78:05	1,450.00
Tri-Cities Aviation School, Inc., Endicott, New York	J3	Lyc. 65	1941	2000	2000	2000	200	1,400.00
Lysdale Flying Service, Victory Airport, Minneapolis 12, Minnesota	J3-C	Cont. 65	1943	1162	835:25	1162	375	1,375.00
Niederhauser Airways, Municipal Airport, Ottumwa, Iowa	J3-F	Frank. 65	1940	2105:02	2105:02	2105:02	668:55	1,350.00
Niederhauser Airways, Municipal Airport, Ottumwa, Iowa	J3-L	Lyc. 65	1940	2824:55	2824:55	2824:55	605:55	1,350.00
D. G. Flying Service, Elwood Airport, Elwood, Indiana	J3	Frank. 65	1941	2458	2657	2458	72	1,300.00
St. Louis Flying Service, Kratz Field, St. Louis 21, Missouri	J3-C	Frank. 65	1943	1990	1234	1990	147:30	1,295.00
St. Louis Flying Service, Kratz Field, St. Louis 21, Missouri	J3-C	Frank. 65	1943	1345	975	1345	47:30	1,295.00
Willis Reifenberg, St. Johns, Pennsylvania	J3-L	Lyc. 55	1940	1050	675	400	100	1,275.00
Auburn School of Aviation, Auburn, Alabama	J3-F	Frank. 65	1941	1834:40	1836:10	800	800	1,250.00
C. L. Graham, Gadsden Flying Service, Inc., Gadsden, Alabama	J3-L	Lyc. 65	1941	1496:25	1616:40	452:35	463:20	1,250.00
Spartan Aero Repair, Municipal Airport, Tulsa, Oklahoma	J3-L	Lyc. 65	1941	2517	2650	953	547	1,205.00
Aero Industries Corp., Municipal Airport, New Haven, Connecticut	J3-C	Frank. 65	1941	3000	1300	50	200	1,200.00
Bilhobs Flying Service, Rt. 2, Wilmington Island, Savannah, Georgia	J3-C	Cont. 65	1940	1800	200	500	200	1,200.00
Dethloff Flying Service, Bedford Airport, Bedford, Ohio	J3	Frank. 50	1939	1200	1200	150	150	1,200.00
A. A. Walzak, Brooklyn Airport, Cleveland 9, Ohio	J3	Frank. 65	1940	1200	1200	100	100	1,175.00
St. Louis Flying Service, Kratz Airport, St. Louis, Mo.	J3-F	Frank. 65	1941	2758	2081	2756	147	1,175.00
A. A. Walzak, Brooklyn Airport, Cleveland 9, Ohio	J3	Frank. 65	1940	1100	1100	150	150	1,175.00

DEALER	MODEL NO.	TYPE ENGINE	YEAR BUILT	TOTAL HOURS		HOURS SINCE LAST MAJOR OVERHAUL		PRICE
				PLANE	ENGINE	PLANE	ENGINE	
King Cruse, San Benito Flying Service, Box 1774, San Benito, Texas	J3-A	Cont. 65	1940	2682:40	2049:30	72:55	199:10	$1,150.00
Niederhauser Airways, Box 262, Marshalltown, Iowa	J3	Lyc. 65	1940	2330	2335	617	617	1,150.00
Niederhauser Airways, Box 262, Marshalltown, Iowa	J3	Lyc. 65	1941	1932	2260	710	710	1,150.00
Niederhauser Airways, Box 262, Marshalltown, Iowa	J3	Lyc. 65	1941	3456	3353	314	314	1,150.00
Ray Devener, Devener Airport, Hanover, Pennsylvania	J3	Lyc. 65	1939	1570:20	1620	272	110	1,050.00
Via Air, St. Clair County Airport, Port Huron, Michigan	J3	Frank. 60	1940	1281:25	1281:25	0	50	1,000.00
Valparaiso Aero Club, Inc., Urschel Field, Valparaiso, Indiana	J3	Frank.	1940	2485	1392	2485	250	1,000.00
Valparaiso Aero Club, Inc , Urschel Field, Valparaiso, Indiana	J3	Frank.	1940	1472:40	1735:15	1472:40	72:25	1,000.00
Ray Devener, Devener Airport, Hanover, Pennsylvania	J3	Frank. 50	1939	1400	529	165	198	850.00
PORTERFIELD								
Washington Flying Service, Washington, Iowa	CP-65	Cont. 65	1940	2089	2054:55	50	210	1,750.00
Francis School of Aviation, Capitol City Airport, Lansing, Michigan	LP-65	Frank. 65	1941	1015	1793	42:25	42:25	1,650.00
Spartan Aero Repair, Municipal Airport, Tulsa, Oklahoma	LP-65	Lyc. 65	1940	1732	1732	0	0	1,475.00
Francis School of Aviation, Capitol City Airport, Lansing, Michigan	LP-65	Lyc. 65	1941	1607	1409	133:40	315:30	1,400.00
Flint Flying Service, Bishop Airport, Flint, Michigan	LP-65	Lyc. 65	1941	1734	1756	500	500	1,200.00
REARWIN								
The Coogan Company, 8440 Sunset Blvd., Hollywood 46, California	8135T	Ken-Royce 120	1942	1800	540	0	22	2,950.00
M. L. Kruer, Wawhsee Airport, Syracuse, Indiana	175	Cont. 75	1940	650	650	650	400	2,250.00
RYAN								
Maheu's Airport, Inc., R.F.D. No. 2, Mechanic Falls, Maine	ST-A	Menasco 125	1937	2159	1765	52:25	338:05	2,195.00
Red Bank Airport, Inc., P.O. Box 28, Red Bank, New Jersey	ST-3KR	Kinner 160	1942	1942	164	1942	164	1,650.00
Washington Flying Service, Washington, Iowa	ST-3KR	Kinner 160	1942	2452	530	2452	530	1,650.00
Flathead Air Transport, Inc., New Flathead County Air Port, Kalispell, Montana	ST-3KR	Kinner 160	1942	2500	450	450	450	1,600.00
St. Louis Flying Service, Kratz Airport, St. Louis, Missouri	PT-22	Kinner	1941	2083	437	2083	437	1,475.00
Rawdon Bros. Flying Service, P.O. Box 1135, Wichita, Kansas	ST-3KR	Kinner 160	1942	1500	250	50	250	1,050.00
STEARMAN								
The Coogan Company, 8440 Sunset Blvd., Hollywood 46, California	PT-17	Cont. 220	1942	1200	900	450	168	1,450.00
Donald Hansen, Lakeview Airport, Lakeview, Michigan	PT-17	Cont. 220	1940	1300	700	1300	250	1,300.00
Byerly-Wagener Aviation, Mt. Hawley Airport, Peoria, Illinois	PT-13	Lyc. 225	1941	962	333	962	333	1,100.00
STINSON								
Buffalo Aeronautical Corp., Buffalo Airport, Buffalo 11, New York	7W	P & W 450	1937	1200	350	1200	350	20,000.00
Francis School of Aviation, Capitol City Airport, Lansing, Michigan	SR-9	Lyc. 290		3140	3140	242:50	73:25	7,600.00
St. Louis Flying Service, Kratz Airport, St. Louis, Missouri	AT-19	Lyc. 295	1944	39:15	39:15	39:15	39:15	7,500.00
Continental Divide Aviation, Municipal Airport, Rawlins, Wyoming	150	Frank. 150	1946	270	270	0	0	5,500.00
Wenatchee Air Service, Box 1160, Wenatchee, Washington	SR-4	Wright	1932	1150	1150	50	130	5,500.00
Connecticut Valley Air Service, White Mt. Air Terminal, Whitefield, N. H.	108	Frank. 180	1946	56	56	56	56	5,500.00
J. A. Seitzinger, Gordon, Pennsylvania	AT-19	Lyc. 300	1944	23	24	23	24	4,950.00
Buffalo Aeronautical Corp., Buffalo Airport, Buffalo 11, New York	108	Frank.	1946	400	400	0	0	4,750.00
Detroit Seaplane Base, Inc., 100 Meadowbrook, Detroit 14, Michigan	SR-5	Lyc. 225	1934	1037	1038	1037	508	3,600.00
Pierce Flying Service, Inc., Plymouth Airport, Plymouth, Indiana	10A	Frank. 90	1941	1300	60	11	11	3,000.00
Dewey Mauk, Box 460, Blackwell, Oklahoma	10A	Frank. 90	1942	780	800	300	300	2,995.00
Spartan Aero Repair, Municipal Airport, Tulsa, Oklahoma	L5	Lyc. 190	1943	1200	1200	0	0	2,975.00
Buffalo Aeronautical Corp., Buffalo Airport, Buffalo, New York	10A	Frank. 90	1941	1335	698:30	1335	20	2,750.00
Byerly Wagener Aviation, Mt. Hawley Airport, Peoria, Illinois	10A	Frank. 90	1941	893	893	294	487	2,750.00
Beloit Airways, Russel E. Van Galder, Box 532, Beloit, Wisconsin	SM8-A	Lyc. 215	1930	1925	1925	10	10	2,350.00
Clear Ridge Aviation, Inc., 72nd & Crown Point Ave., Omaha, Nebraska	L5	Lyc. 185	1943	750	750	5	750	2,250.00
Red Bank Airport, Inc., P.O. Box 28, Red Bank, New Jersey	105	Cont. 75		428	452	428	20	2,200.00
Clear Ridge Aviation, Inc., 72nd & Crown Point Ave., Omaha, Nebraska	L5	Lyc. 185	1943	575	575	10	575	1,750.00
TAYLORCRAFT								
North Michigan Air Service, Inc., Petoskey, Michigan	BF12	Frank. 65	1941	1954	359	116	116	3,200.00
Gardinier Flying Service, Medford Airport, Medford, Wisconsin	BC12-D	Cont. A65	1946	130	130	0	0	2,675.00
Gordon Air Service, Box 195, Gordon, Nebraska	BC12-D	Cont. 65	1946	150	150	150	150	2,650.00
Stan Staples, 220 Broadway, Chico, California	BC12-D	Cont. A65-8	1946	114	114	114	114	2,500.00
Via Air, St. Clair County Airport, Port Huron, Michigan	BC-12	Cont. 65	1946	178	178	178	178	2,250.00
Southern Airways, Inc., Route 224, Youngstown, Ohio	BC12	Cont. 65	1946	100	100	0	0	2,250.00
Evergreen Airport, Warren, Illinois	BC12-D	Cont. 65	1946	200	200	200	200	2,250.00
Farly's Air Park, Box 72, New Baltimore, N. Y.	BC12-D	Cont. 65	1946	50	50	50	50	2,100.00
Goddard Flying Service, Ardmore Airport, Ardmore, Oklahoma	BC-12	Cont. 65	1941	40	40	0	0	2,100.00
Via Air, St. Clair County Airport, Port Huron, Michigan	BC-12	Cont. 65	1946	320	320	320	320	2,000.00
The Lakin Flying Service, Inc., P.O. Box 317, Warrensburg, Missouri	B12-D	Cont. 65	1946	125	125	125	125	2,000.00
Goddard Flying Service, Ardmore, Oklahoma	BC-12	Cont. 65	1944	40	40	0	0	2,000.00
Farly's Air Park, Box 72, New Baltimore, New York	Ace	Cont. 65	1946	5	5	5	5	1,995.00
Spartan Aero Repair, Municipal Airport, Tulsa, Oklahoma	BC12	Cont. 65	1940	1500	1500	0	0	1,975.00
Inter-City Flying Service, Municipal Airport, Ft. Wayne 8, Indiana	BC12-D	Cont. 65	1946	417	417	417	417	1,950.00
Richard P. Harner, Coshocton Airport, Coshocton, Ohio	Ace		1946	50	50	0	0	1,950.00
Intercity Flying Service, Municipal Airport, Ft. Wayne, Indiana	BC12-D	Cont. 65	1946	426	426	426	426	1,900.00
Maheu's Airport, Inc., R.F.D. No. 2, Mechanic Falls, Maine	BL	Lyc. 65	1940	751:25	750:25	200:15	190:45	1,850.00
Duane D. Otis, Huntingburg Airport, Huntingburg, Indiana	DCO	Cont. 65	1943	590	590	0	0	1,800.00
Francis School of Aviation, Capitol City Airport, Lansing, Michigan	BL12	Lyc. 65	1940	1202	1124	564:20	1124	1,750.00
Park Region Aviation, Inc., Fergus Falls, Minnesota	DC	Cont. 65	1942	50	50	50	50	1,700.00
John L. Coppernoll, Stockton, Illinois	BL-65	Lyc. 65	1940	550	550	150	150	1,600.00
Gridley Flying Service, Box 56, Ypsilanti, Michigan	B-12	Frank. 65	1941	1580	1580	580	580	1,500.00
Dyersburg Flying Service, Box 38, Dyersburg, Tennessee	L2-B	Cont. 65	1943	1100	1100	1100	30	1,500.00
Aero Industries Corp., Municipal Airport, New Haven, Connecticut	L2-M	Cont. 65	1943	775	775	500	355	1,500.00
Eddy McEnnan, McEnnan Airport, Ypsilanti, Michigan	DCO	Cont. 65	1944	680	288	680	288	1,500.00
John L. Coppernoll, Stockton Airport, Stockton, Illinois	DCO-65	Cont. 65	1943	550	550	30	30	1,500.00
Duane D. Otis, Huntingburg Airport, Huntingburg, Indiana	DCO	Cont. 65	1943	800	700	5	400	1,475.00
Dyersburg Flying Service, Box 381, Dyersburg, Tennessee	L2-B	Cont. 65	1943	937	937	112	4	1,450.00
The Lakin Flying Service, Inc., P.O. Box 317, Warrensburg, Missouri	L2-B	Cont. 65	1942	710	710	200	200	1,450.00
Inter-City Flying Service, Municipal Airport, Ft. Wayne 8, Indiana	BC-12	Cont. 65	1941	2782	616	843	132	1,450.00
Francis School of Aviation, Capitol City Airport, Lansing, Michigan	BL-12	Lyc. 65	1941	1422	1972	1422	61:35	1,400.00
Francis School of Aviation, Capitol City Airport, Lansing, Michigan	BL-12	Lyc. 65	1940	2500	590	181	2500	1,400.00
Francis School of Aviation, Capitol City Airport, Lansing, Michigan	BF-12		1942	2672	2330	2672	2330	1,400.00
Dewey Mauk, Box 460, Blackwell, Oklahoma	BL-50	Lyc.	1937	1395	740	96	100	1,295.00
Dows Flying Service, Inc., Dows, Iowa	L2-B	Cont. 65	1942	800	800	800	100	1,250.00
Carl F. Petersen, Box 621, Mount Ayr, Iowa	L2-M	Cont. 65	1943	563	563	563	170	1,200.00
Clear Ridge Aviation, Inc., 72nd & Crown Point Ave., Omaha, Nebraska	L-2	Cont. 65	1944	810	810	200	481	1,150.00
Via Air, St. Clair County Airport, Port Huron, Michigan	L2-B	Cont. 65	1943	515	515	515	50	1,000.00
Evergreen Airport, Warren, Illinois	DCO	Cont. 65	1943	650	650	650	30	1,000.00
French Aero Service, Washington Air Park, Washington, C. H., Ohio	A-40	Cont. 40	1938	800	800	20	20	895.00
TIMM								
Frank Tehinnis, 10 Sherman Road, Farmingdale, Long Island, New York		Cont. 220	1943	753	277	0	0	1,800.00
Down East Airlines, Main State Airport, Augusta, Maine	N2T-1	Cont. 220	1943	278:08	807:28	278:08	204:17	1,795.00
Frank Tehinnis, 10 Sherman Road, Farmingdale, Long Island, New York		Cont. 220	1943	508	508	0	0	1,700.00
VULTEE								
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	BT-13A	P & W 450	1943	2075	997	27	27	2,250.00
Plainfield Airways, Inc., Plainfield, Connecticut	BT-13A	450 H.P.	1943	1500	575	10	575	1,800.00
Farley's Air Park, Box 72, New Baltimore, New York	BT-13B	P & W	1943	500	110	500	110	1,700.00
St. Louis Flying Service, Kratz Airport, St. Louis, Missouri	BT-13B	P & W 450	1944	396	396	396	396	1,675.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	BT-13A	P & W 450	1943	1353	1611	1353	131	1,650.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	BT-13A	P & W 450	1943	2140	1835	2140	45	1,650.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	BT-13A	P & W 450	1943	3240	2075	200	510	1,650.00
Flint Flying Service, Bishio Airport, Flint, Michigan	BT-13	P & W 450		3723	1228	0	0	1,600.00
Arkansas Aviation Service, Grider Field, Pine Bluff, Arkansas	SNV	P & W 450	1943	1100	900	1100	100	1,595.00
St. Louis Flying Service, Kratz Field, St. Louis 21, Missouri	BT-13A	P & W 450	1943	3454	329	3458	329	1,575.00
St. Louis Flying Service, Kratz Field, St. Louis 21, Missouri	BT-13A	P & W 450	1943	2472	2109	2472	109	1,575.00

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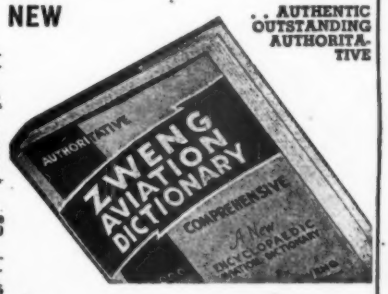

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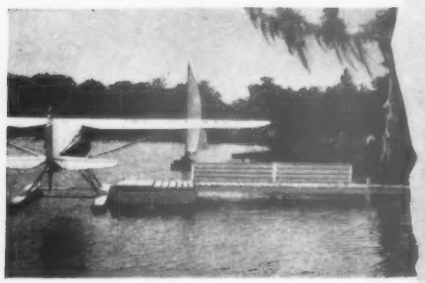

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— Letter from Thomas M. Turner, Jr., Operator of the Orlando Aviation Country Club, on Lake Killarney, Orlando, Florida

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There are thousands of spots in America where you can follow his example and set up a successful base of your own. Rivers, harbors, natural and artificial lakes, bays and sounds — all are available near cities. Float flying is growing fast, with float plane production up 2,600 per cent over pre-war levels. You can be your own boss, if you set up a float base.

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